

# HP R/T3000 G2 UPS User Guide

## Abstract

This document includes installation, configuration, and operation information for the HP R/T3000 G2 UPS. This document is for the person who installs and maintains power products. HP assumes you are qualified in the servicing of high-voltage equipment and trained in recognizing hazards in products with hazardous energy levels.



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# Component identification

## UPS R/T3000 G2 overview

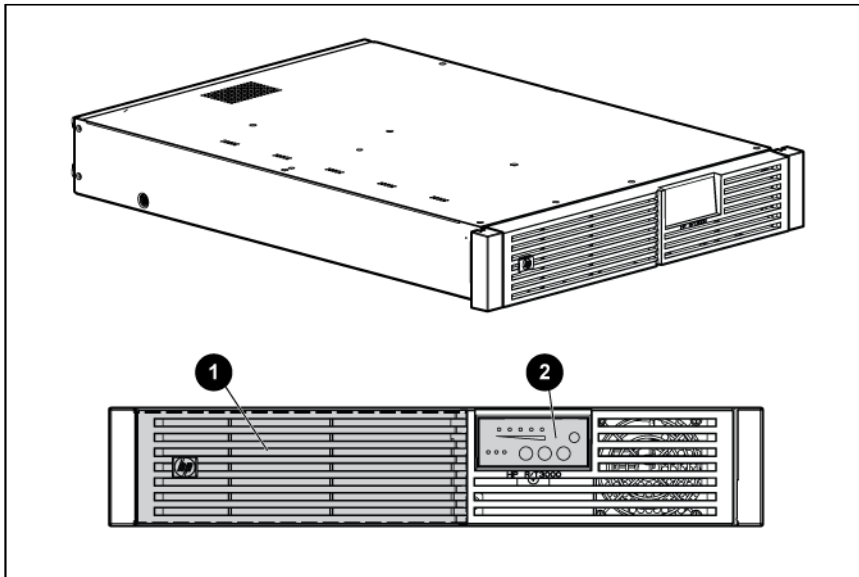
The HP UPS R/T3000 G2 features a 2U rack-mount with convertible tower design and offers power protection for loads up to a maximum of 3300 VA/3000 W (these numbers might vary by model).

To benefit from the latest product enhancements, update to the latest versions of UPS firmware and software.

**NOTE:** To download the latest versions of UPS firmware and software, see the HP website (<http://www.hp.com/go/rackandpower>).

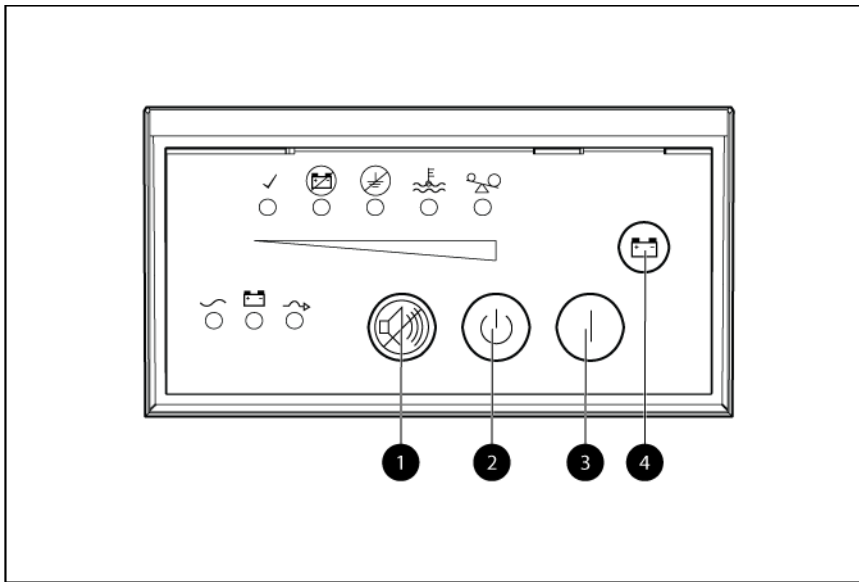
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## UPS front panel



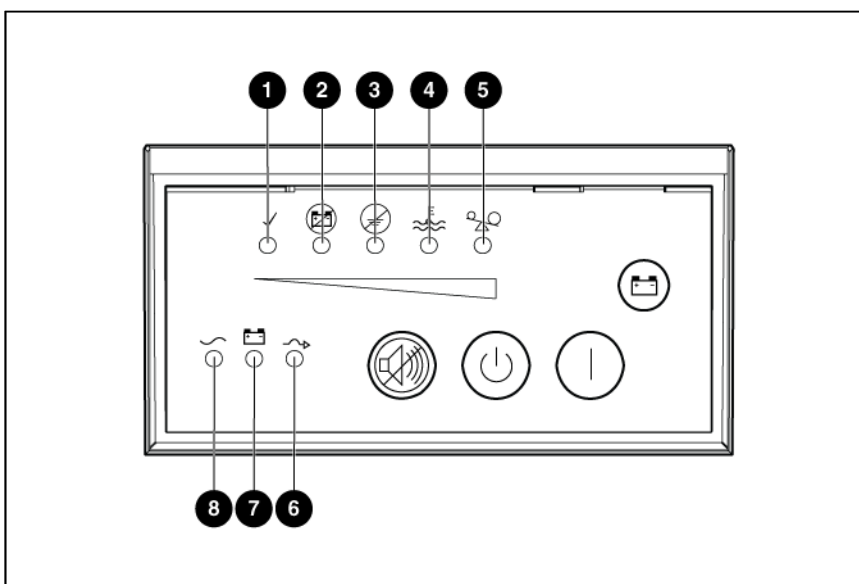
Item	Description
1	Battery compartment
2	Front panel display

# UPS front panel controls



Item	Description	Function
1	Test/Alarm Reset button	Silences UPS alarms (" <a href="#">Silencing an audible alarm</a> " on page 44)
2	Off button	Places the UPS in Standby mode (on page 40)
3	On button	Powers up the UPS (" <a href="#">Starting power to the load</a> " on page 26)
4	Battery Start button	Starts the UPS on battery power when pressed with the On button

# UPS front panel LED indicators





The front panel is shown with the bezel removed.

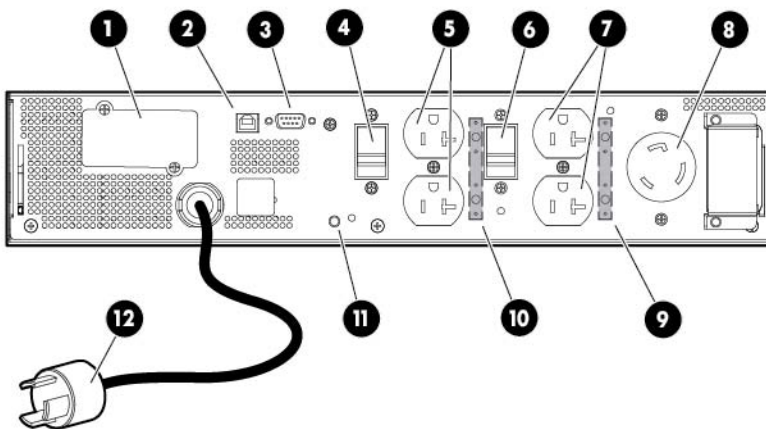
Item	LED description	Load level
1	Self Test	On—The load level is greater than 10%.
2	Battery Fault	On—The load level is greater than 25%.
3	Site Wiring Fault	On—The load level is greater than 50%.
4	Overtemperature	On—The load level is greater than 75%.
5	Overload	On—The load level is greater than 100%.
6	On Bypass	
7	On Battery	
8	Utility	

For more information, see "LED troubleshooting (on page 55)" .

## HP UPS R/T3000 models

UPS model	Description
R/T3000 NA and R/T3000j JPN	<ul style="list-style-type: none"> <li>• Domestic/Japanese</li> <li>• Low-voltage</li> <li>• Nondetachable NEMA L5-30 plug</li> </ul>
R/T3000h NA and R/T3000h JPN	<ul style="list-style-type: none"> <li>• Domestic</li> <li>• High-voltage</li> <li>• Nondetachable NEMA L6-20 plug</li> </ul>
R/T3000 INT	<ul style="list-style-type: none"> <li>• International</li> <li>• High-voltage</li> <li>• Detachable country-specific plug</li> </ul>

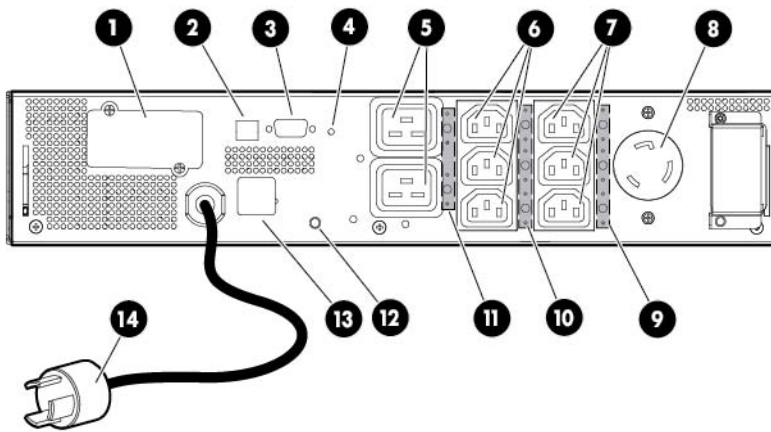
## R/T3000 NA and R/T3000j JPN rear panel



Item	Description
1	UPS option card
2	USB communications port
3	Serial communications port

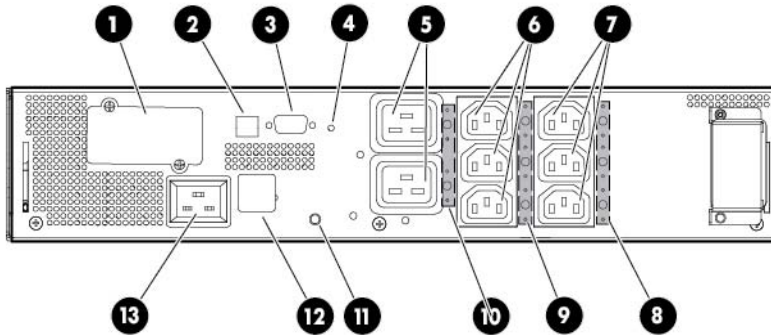
Item	Description
4	Load segment circuit breaker
5	Load segment 1 (two NEMA 5-20R T-Slot receptacles)
6	Load segment circuit breaker
7	Load segment 2 (two NEMA 5-20R T-Slot receptacles)
8	PDU output (NEMA L5-30R) receptacle (load segment 1)
9	Cord retention clip attachment location
10	Cord retention clip attachment location
11	Ground bonding screw
12	Power cord with L5-30 plug

## R/T3000h NA and R/T3000h JPN rear panel



Item	Description
1	UPS option card
2	USB communications port
3	Serial communications port
4	Ground bonding screw
5	Load segment 1 and 2 (one IEC-320-C19 receptacle)
6	Load segment 1 (three IEC-320-C13 receptacles)
7	Load segment 2 (three IEC-320-C13 receptacles)
8	PDU output (L6-20) receptacle (load segment 1)
9	Cord retention clip attachment location
10	Cord retention clip attachment location
11	Cord retention clip attachment location
12	Ground bonding screw
13	REPO port
14	Power cord with L6-20 plug

# R/T3000 INT rear panel



Item	Description
1	UPS option card
2	USB communications port
3	Serial communications port
4	Ground bonding screw
5	Load segment 1 and 2 (one IEC-320-C19 receptacle)
6	Load segment 1 (three IEC-320-C13 receptacles)
7	Load segment 2 (three IEC-320-C13 receptacles)
8	Cord retention clip attachment location
9	Cord retention clip attachment location
10	Cord retention clip attachment location
11	Ground bonding screw
12	REPO port
13	Input power receptacle (IEC-320-C19) for country-specific plug attachment

## REPO port

The UPS includes an isolated REPO port. When properly wired, the REPO feature enables the power at the UPS output receptacles to be switched off from a remote location. To use this feature, the REPO port must be connected to a remote, normally-open switch (not supplied). The REPO switch is used in conjunction with a main disconnect device that removes the AC source from the input of the UPS. When the switch is closed:

- The REPO feature immediately powers down protected devices and does not utilize the orderly shutdown procedure initiated by power management software.
- The REPO feature shuts down UPS units operating under either utility or battery power.

**NOTE:** If the UPS was operating on battery power when the remote switch was closed, no power is available to the load devices until utility power is restored and the UPS has been manually powered up.

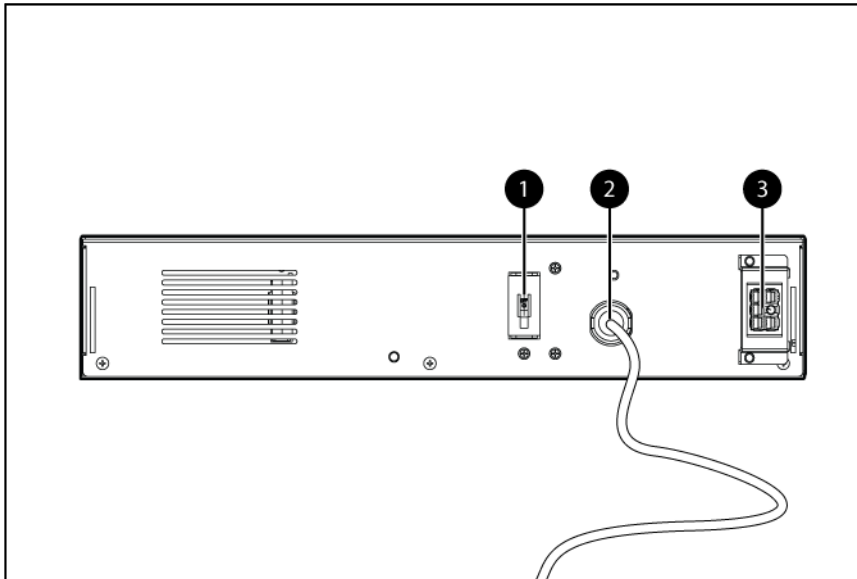
To restore power to the load devices after the REPO feature is activated, press the On button after the AC source is reconnected to the UPS.



**IMPORTANT:** Pressing and holding the On button without utility present normally initiates a battery start and the UPS assumes the load. However, if the On button is pressed and a REPO is detected, battery start is inhibited and the UPS is not able to assume the load. The electronics module fan spins, and the Self Test, Battery Fault, Site Wiring Fault, and Overtemperature LEDs and an audible alarm are active as long as the On button is held.

To power down the entire network in the event of an emergency, the REPO ports of multiple UPS units can be connected to a single switch.

## ERM rear panel



Item	Description
1	Circuit breaker
2	ERM output connector cable (to the UPS)
3	ERM input connector (from another ERM)

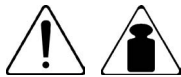
# Installation

## Precautions

Save these instructions. This document contains important safety instructions that should be followed during installation, operation, and maintenance of the UPS and batteries.



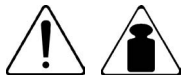
**WARNING:** A risk of personal injury from electric shock and hazardous energy levels exists. The installation of options and routine maintenance and service of this product must be performed by individuals who are knowledgeable about the procedures, precautions, and hazards associated with AC power products.



37 kg  
82 lb

This symbol indicates that the UPS exceeds the recommended weight for one individual to handle safely.

**WARNING:** To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.



45 kg  
100 lb

This symbol indicates that the ERM exceeds the recommended weight for one individual to handle safely.

**WARNING:** To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.



**WARNING:** To prevent personal injury from earth conductor leakage current:

- Do not operate the UPS while disconnected from the utility power source.
- Disconnect load devices before disconnecting the UPS from the utility power source.

## Preparing to install the hardware

Before installing the hardware:

1. Be sure the necessary tools and materials (on page 13) are available.
2. Select an installation site ("[Selecting a site](#)" on page 14).
3. Prepare the equipment ("[Readying the equipment](#)" on page 14) for installation in the rack.

## Tools and materials

The following tools are required for installation:

- Phillips screwdriver
- 10-mm hex-nut driver


The following items are supplied with the rack:

- Screws

- Hex nuts
- Cage nuts
- Cage nut-fitting tool

## Selecting a site

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 **WARNING:** To prevent fire or electric shock, install the unit in a temperature- and humidity-controlled indoor environment, free of conductive contaminants.


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When selecting a site, consider the following factors:

- Elevated operating ambient temperature—If the equipment is installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment might be greater than room ambient temperature. Install the equipment in an environment compatible with the operating temperature ("[Environmental specifications](#)" on page 63).
- Reduced air flow—In the rack, the rate of air flow required for safe operation of the equipment must not be compromised.
- Circuit overloading—Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- Reliable earthing—Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit, such as the use of power strips.
- Electrical requirements—All models require a dedicated (unshared) branch circuit, suitably rated for the specific UPS as stated in "Input specifications ("[UPS input specifications](#)" on page 61)" .


## Readying the equipment

1. Check the battery recharge date specified on the label that is affixed to the shipping carton.

 **IMPORTANT:** Do not use the battery if the recharge date has passed. If the date on the battery recharge date label has passed without the battery being recharged, contact an HP authorized service representative for directions.

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2. Transport the packaged unit to its installation location.
3. Unpack the equipment near the rack where the unit will be assembled.

 **CAUTION:** Always plan the rack installation so that the heaviest item is on the bottom of the rack. Install the heaviest item first, and continue to populate the rack from the bottom to the top.

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## Installing the mounting rails



**WARNING:** To reduce the risk of personal injury or damage to the equipment, be sure that:

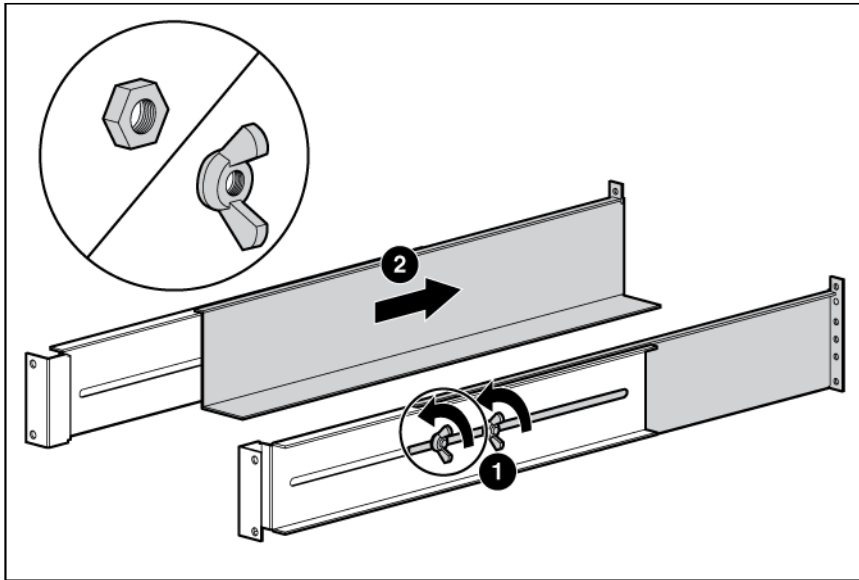
- The leveling feet are extended to the floor.
- The full weight of the rack rests on the leveling feet.
- The stabilizing feet are attached to the rack if it is a single-rack installation.
- The racks are coupled together in multiple-rack installations.
- Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.

If preparing the rails for integrated shipping, follow the same instructions in "Installing the UPS in a rack (on page 17)" or "Installing the UPS as a tower (on page 32)."

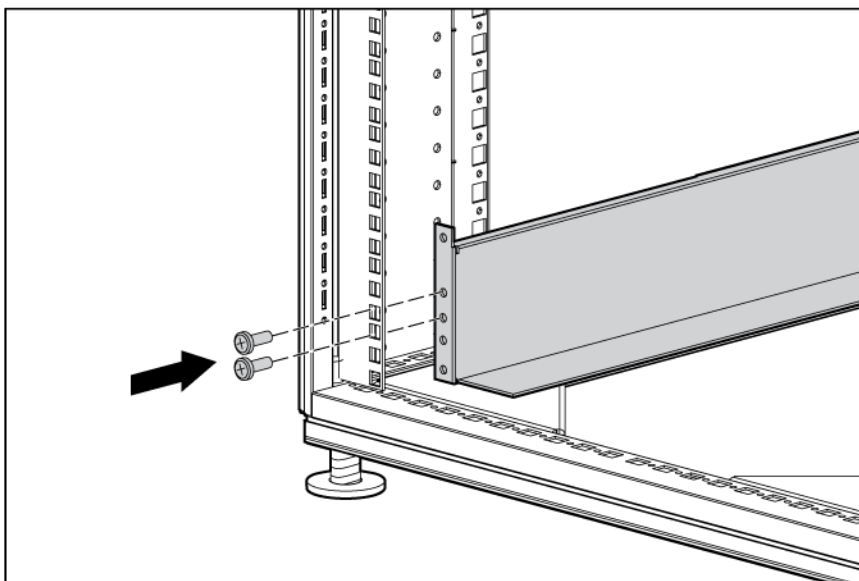
Mounting hardware for square- and round-holed racks is included in the UPS kit.

To install the mounting rails:

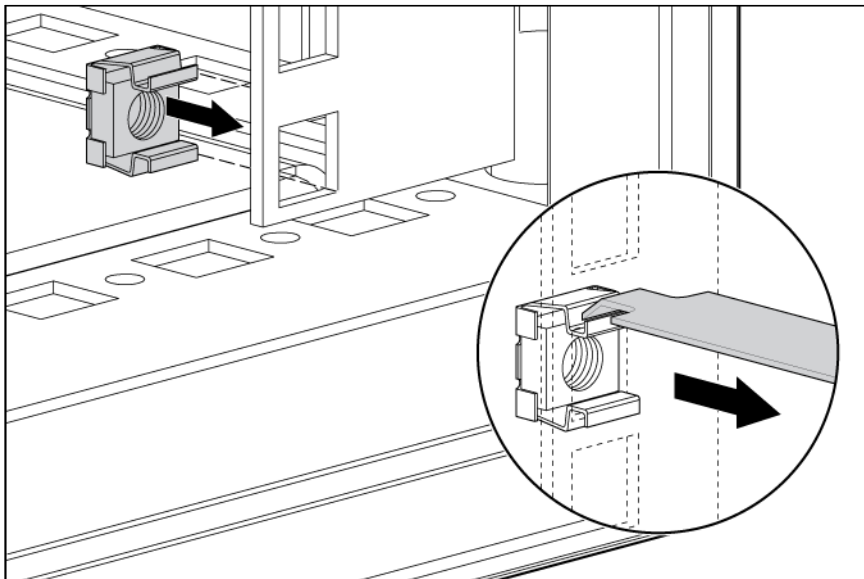
1. Loosen the wing nuts or hex nuts, and then extend the brackets to the appropriate length.



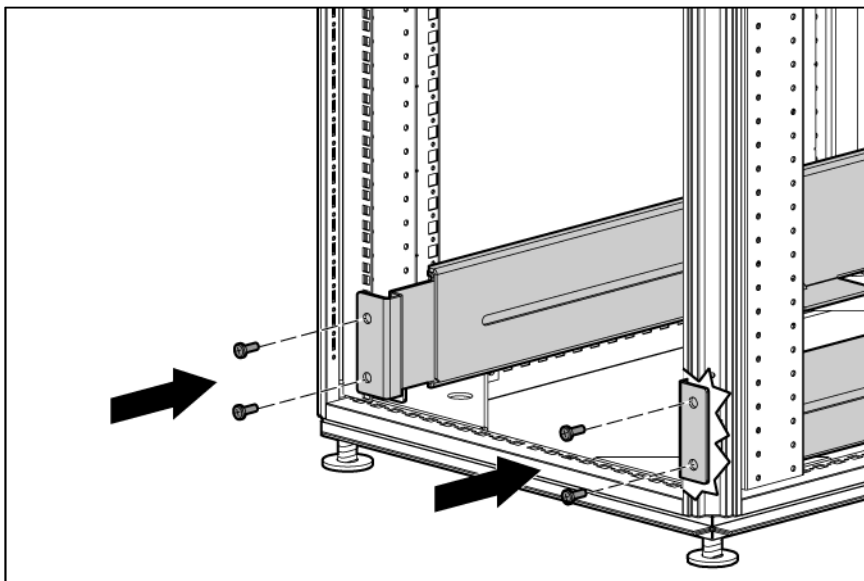
2. Insert screws through the rack into the mounting rail and the front of each mounting bracket.



3. Install cage nuts or clip nuts into the rear of the rack.

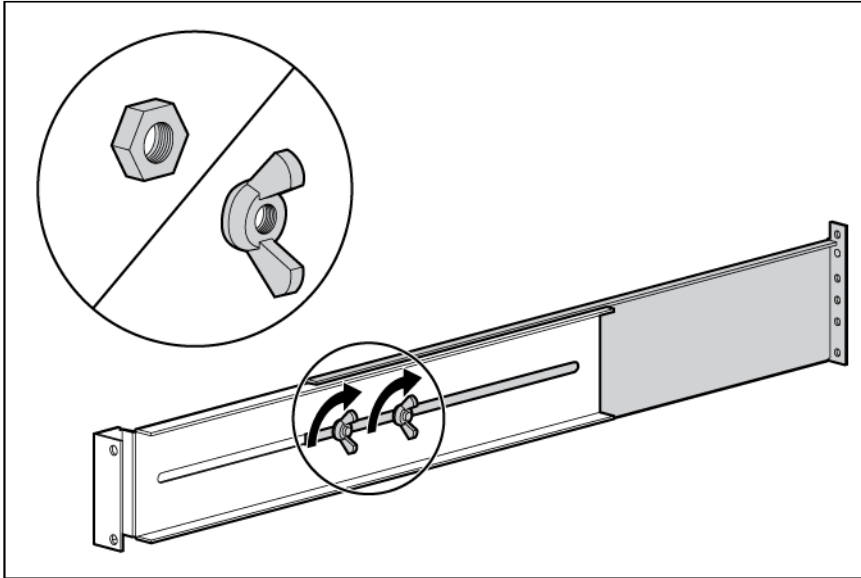


4. Insert screws through the mounting rail into the cage nuts or clip nuts.

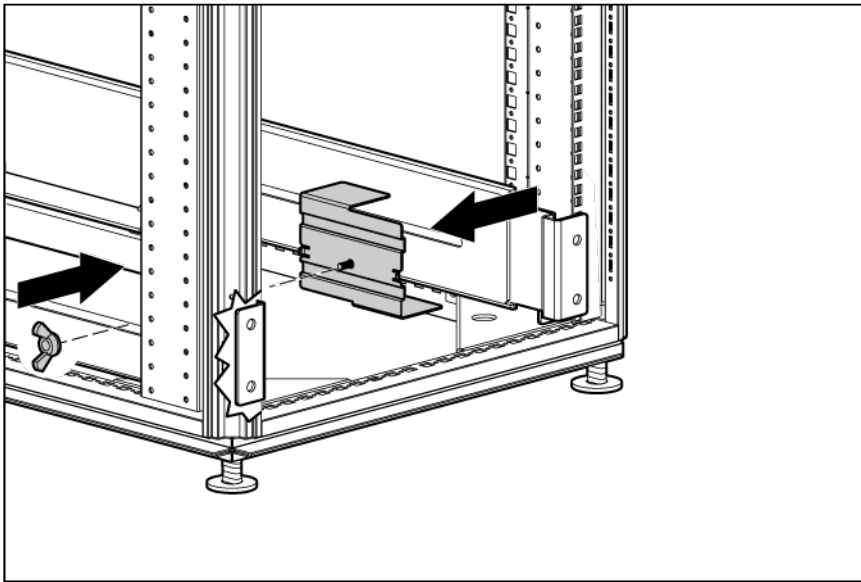




5. Tighten the wing nuts or hex nuts.



6. Install the rear stabilization bracket using wing nuts. Wait until the unit is installed and the brackets are adjusted before tightening the nuts.



## Installing the UPS in a rack

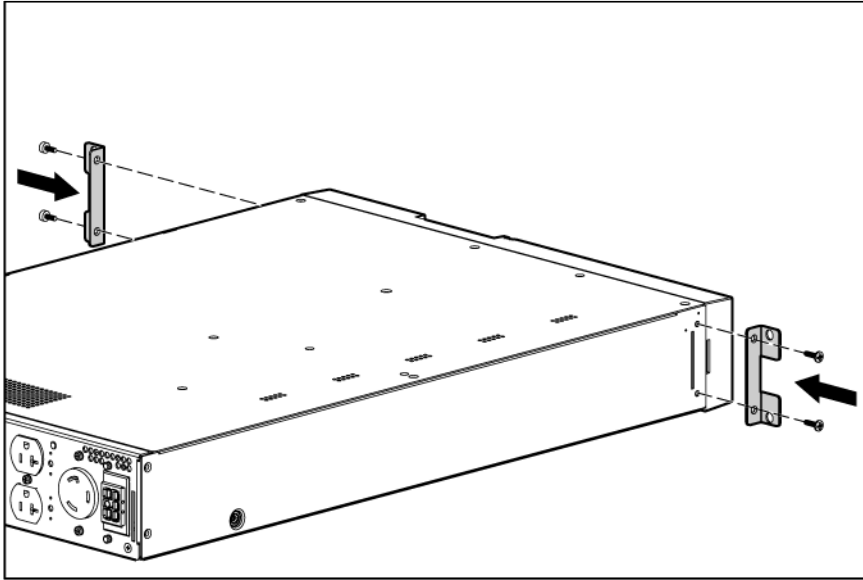
Before installing the unit, review and adhere to all warnings provided in "Precautions (on page 13)."



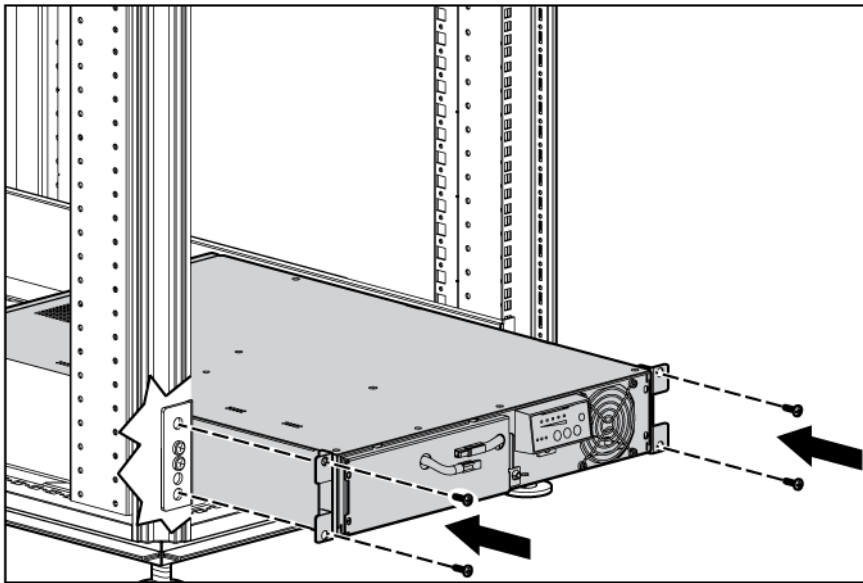
**WARNING:** A risk of personal injury or damage to the equipment exists. Uneven loading of equipment in the rack might cause the rack to become unstable. Install the heavier components first, and then continue to populate the rack from the bottom to the top.

1. Install the mounting rails.

2. Install the mounting ears on the chassis using the screws provided.



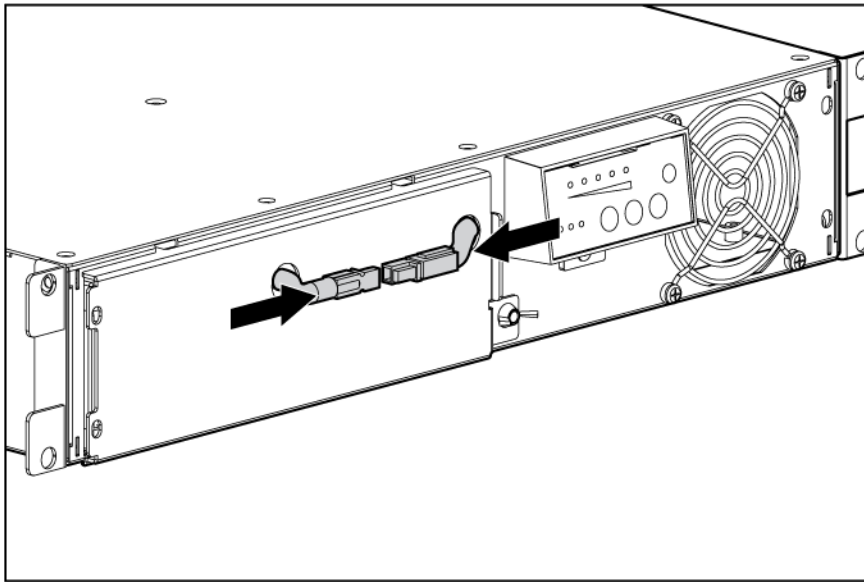
3. With one person on each side, lift the chassis to rail level and slide the chassis on the mounting rails.
4. Attach the chassis to the rack using the supplied screws.



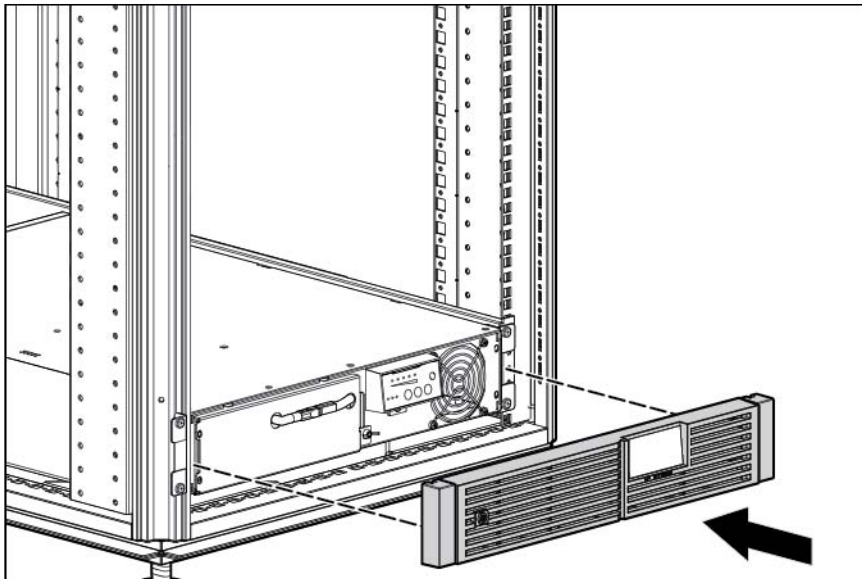
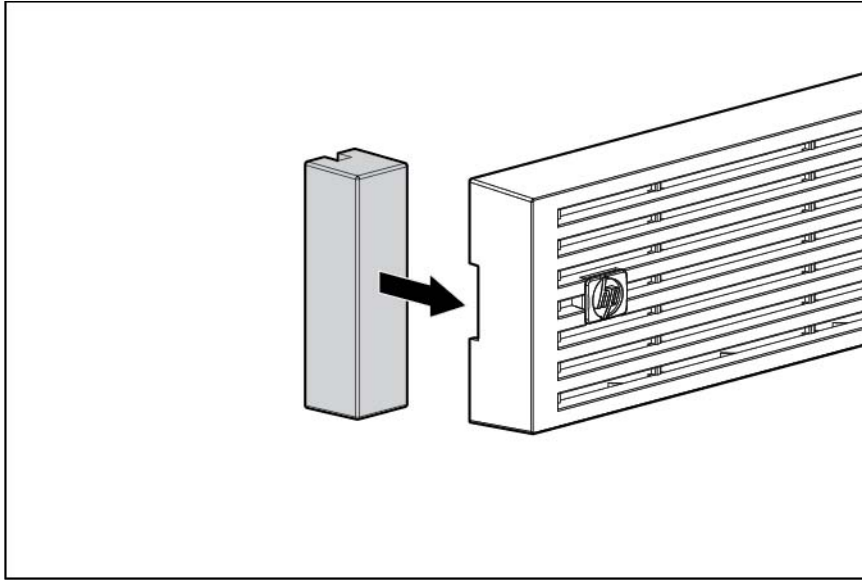
## Connecting the battery leads



**WARNING:** To prevent personal injury from electric shock or damage to the equipment, remove the battery lead labels, and verify that the ERM circuit breakers are in the Off position.



## Attaching the UPS front bezel



## Connecting the host computer

- △ **CAUTION:** Only one communications port can be connected to the host computer. Connecting more than one will result in unexpected UPS behavior. If an option card is installed, the serial and USB communications ports are automatically disabled.

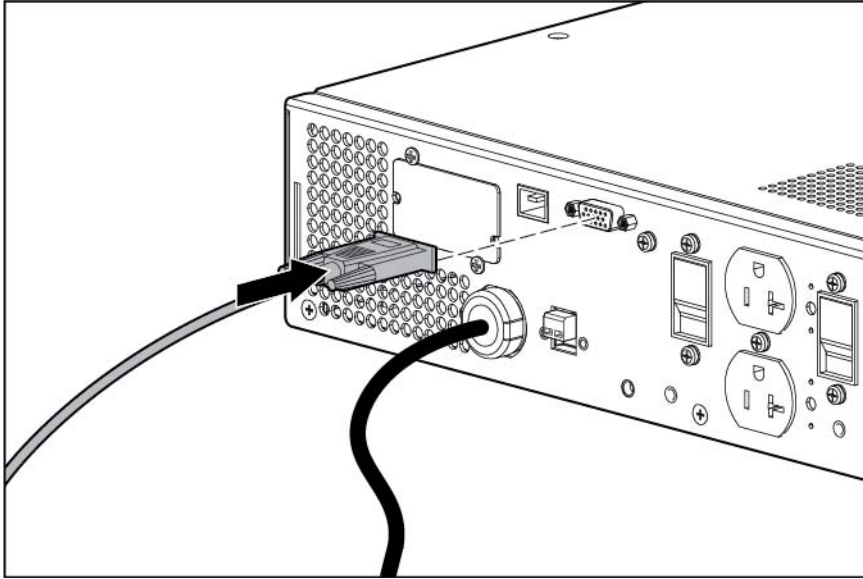
Connect the UPS to a host computer using either the USB cable or the DB9 serial cable included with the UPS. Install HP Power Protector on the host computer. See the HP website (<http://www.hp.com/go/rackandpower>) to download the latest version of HP Power Protector.

**NOTE:** To install and configure the software, see the software user guide. The software user guide is available for download from the HP website (<http://www.hp.com/go/rackandpower>).

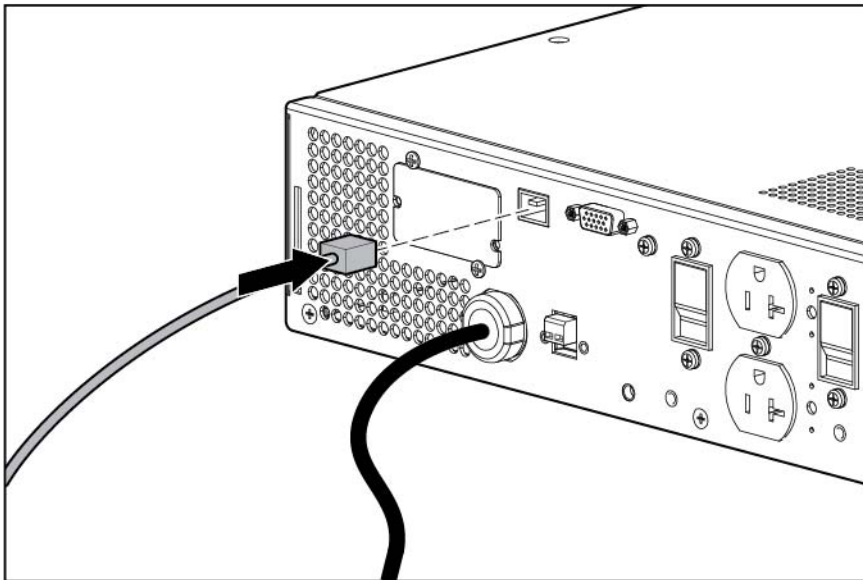
## Connecting the serial communications port

**CAUTION:** Use only the computer interface cable supplied with the UPS to connect the communications port to the host computer.

**IMPORTANT:** Power protector software requires the communications port to be appropriately cabled to the host computer.

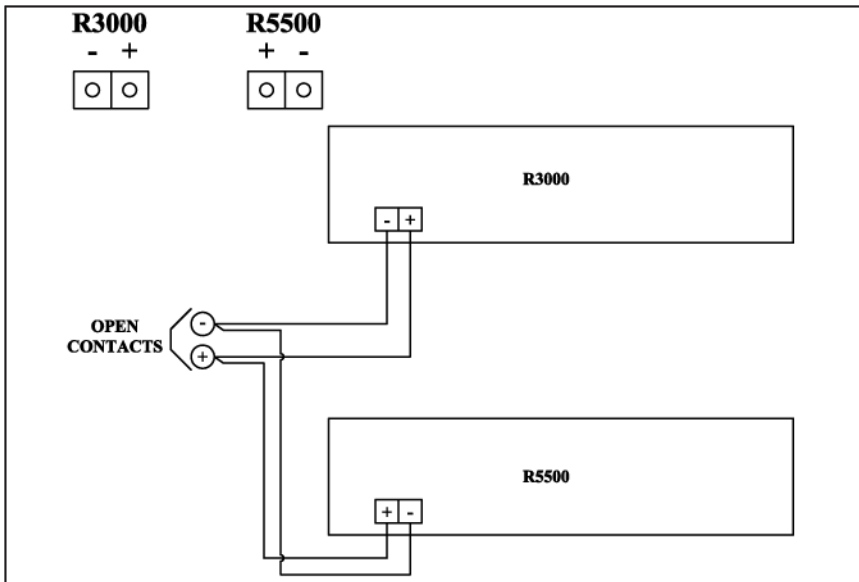


## Connecting the USB communications port



## Connecting the REPO port

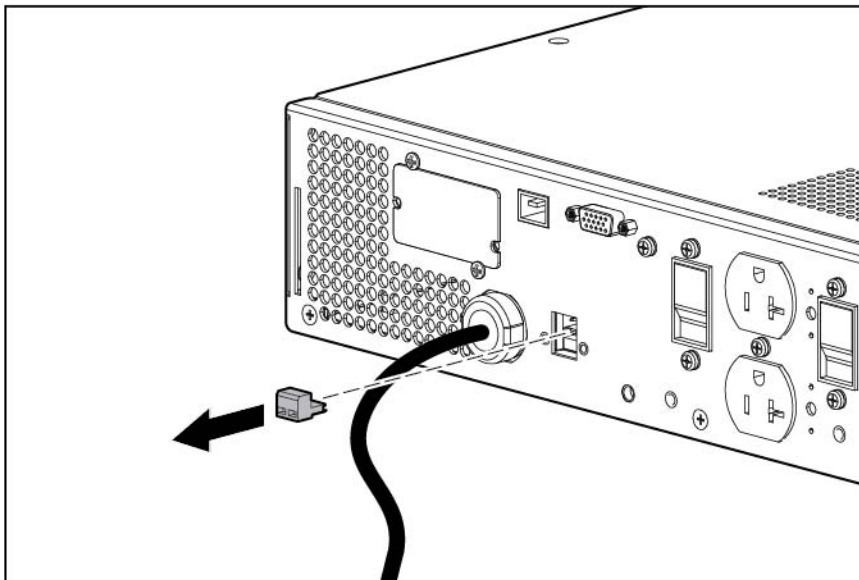
**WARNING:** The pins on the REPO port are polarity sensitive. Be sure to verify polarity while connecting the REPO port.



**WARNING:** To meet the requirements stated in NEC (NFPA 70) Articles 645-10 and 645-11, a UPS installed in a computer equipment room must be connected to a REPO circuit.



**IMPORTANT:** The remote switch must be in the Off (open) position to enable power to the output receptacles.



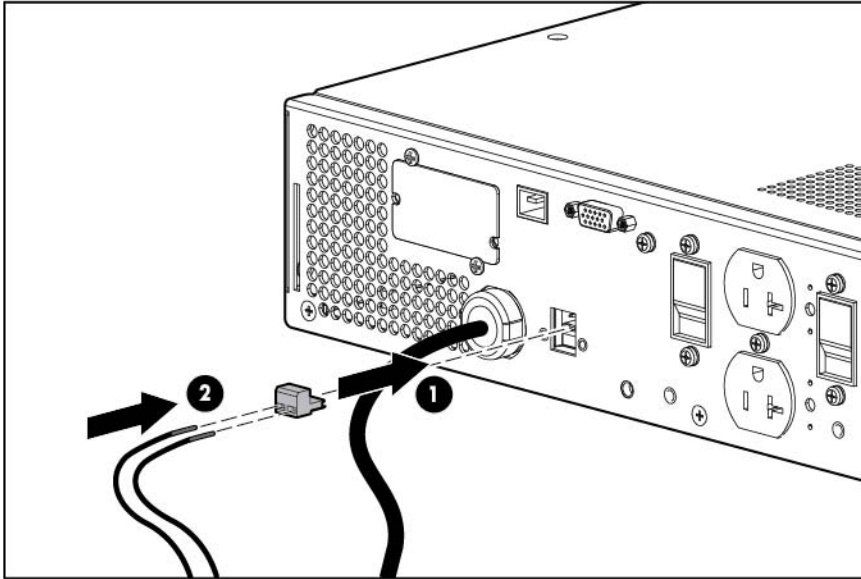
**NOTE:** Wire the connector block using stranded, nonshielded wire (AWG #22 - #18, or equivalent).

Separate wire pairs are attached to a single, normally-open contact in a parallel connection. HP recommends using different colors for the positive and negative wires.

If a connector becomes disconnected and is reconnected with reversed polarity, a REPO is initiated. To avoid REPO port disconnect:

- Minimize wire strain while connecting the REPO port.

- Avoid allowing the wires to hang in the rear of the UPS.
- Use tie wraps and tie wrap blocks to secure the wires tightly to the rack and the rear of the UPS.



For more information about the REPO port, see "REPO port (on page 11)".

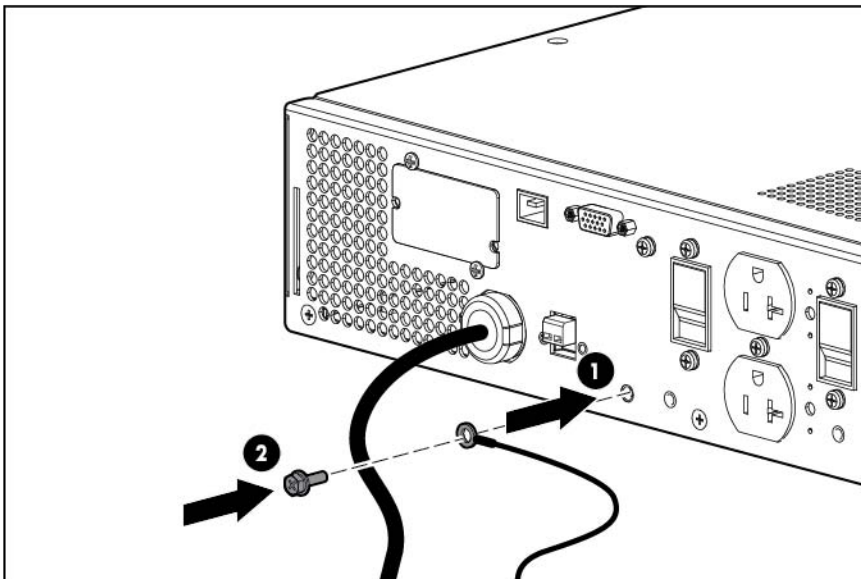
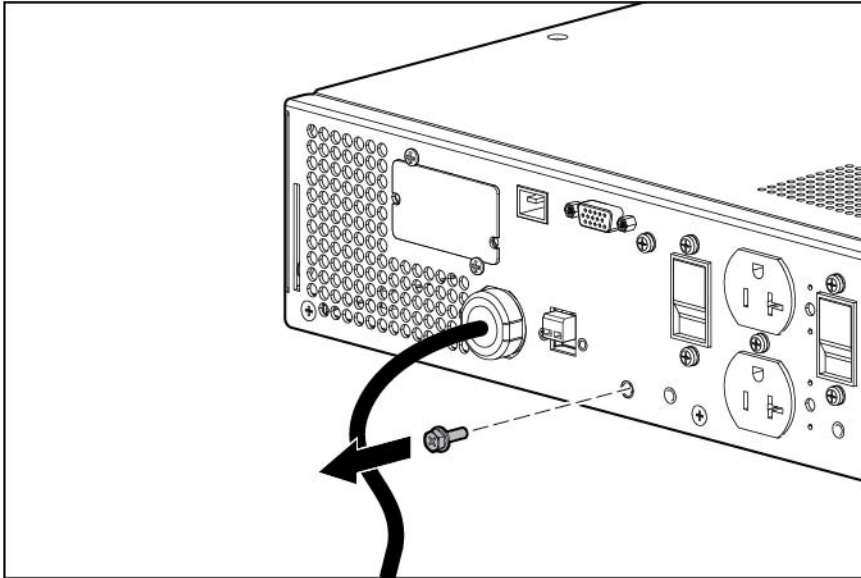
For information about verifying the REPO connection, see "Verifying the REPO port connection (on page 44)".

## Connecting the ground bonding cable

**NOTE:** UPS appearance might vary depending on the specific unit installed.

The ground bonding screw is provided as an attachment point for conductors. Use a ground bonding cable if the rack contains any conductors for the purpose of functional grounding or bonding of ungrounded metal parts.

The ground bonding cable is not included.



## Connecting the UPS to utility power



**WARNING:** To prevent injury from electric shock or damage to the equipment:

- Plug the input line cord into a grounded (earthed) electrical outlet that is installed near the equipment and is easily accessible.
- Do not disable the grounding plug on the input line cord. The grounding plug is an important safety feature.
- Do not use extension cords.

Connect the UPS to a grounded utility power outlet. When the UPS is plugged in, it automatically enters Standby mode and begins charging the batteries.

## Connecting devices to the UPS



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**⚠ CAUTION:** Do not plug laser printers into the UPS output receptacles. The instantaneous current drawn by this type of printer can overload the UPS.

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Before connecting devices, verify that the UPS will not overload by checking that the ratings of the devices do not exceed the UPS capacity. If the equipment rating is listed in amps, multiply the number of amps by the selected output voltage to determine the VA.

After verifying that the UPS will not overload (depending on your model):

- Connect the device power cords to the output receptacles on the rear panel of the UPS.
- or-
- Connect devices to the output receptacles on the rear panel of the UPS using the IEC-to-IEC power cords included with the UPS.

To provide additional receptacles:

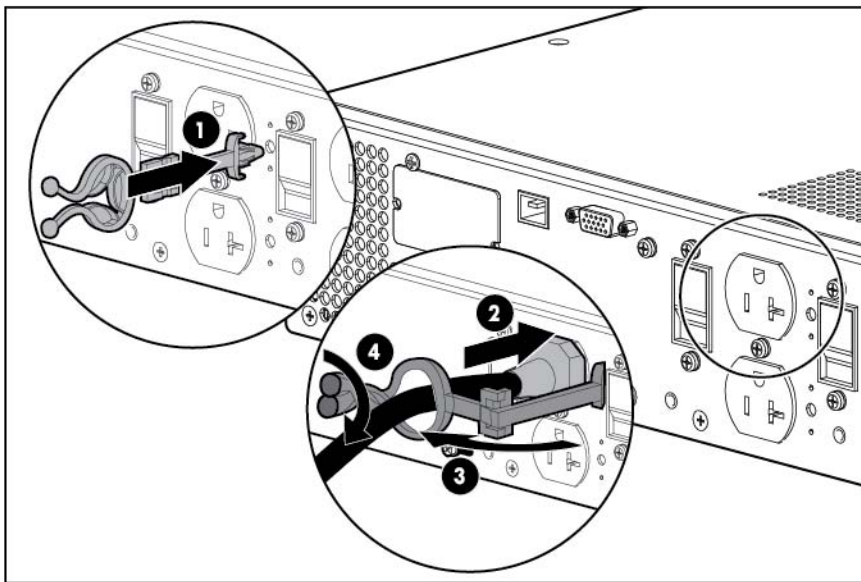
- Plug a PDU into the PDU output receptacle. The PDU output receptacle is part of load segment 1 and can be turned off and on using power protector software (on page 53).
- Plug an extension bar into any IEC-320-C19 receptacle to yield eight additional IEC-320-C13 receptacles.

## Connecting the UPS cord retention clips

---

**NOTE:** UPS appearance might vary depending on the specific unit installed.

---



## Charging the UPS batteries

With the UPS in Standby mode, allow the batteries to charge before putting the UPS into service.



---

**IMPORTANT:** Charge the batteries for at least 24 hours before supplying backup power to devices. The batteries charge to:

- 80 percent of their capacity within 3 hours
  - 100 percent of their capacity within 48 hours
- 

## Starting power to the load

Start power to the load by placing the UPS in Operate mode (on page 40).



---

**IMPORTANT:** AC power must be available the first time the UPS is started.

---

## Installing the ERM in a rack

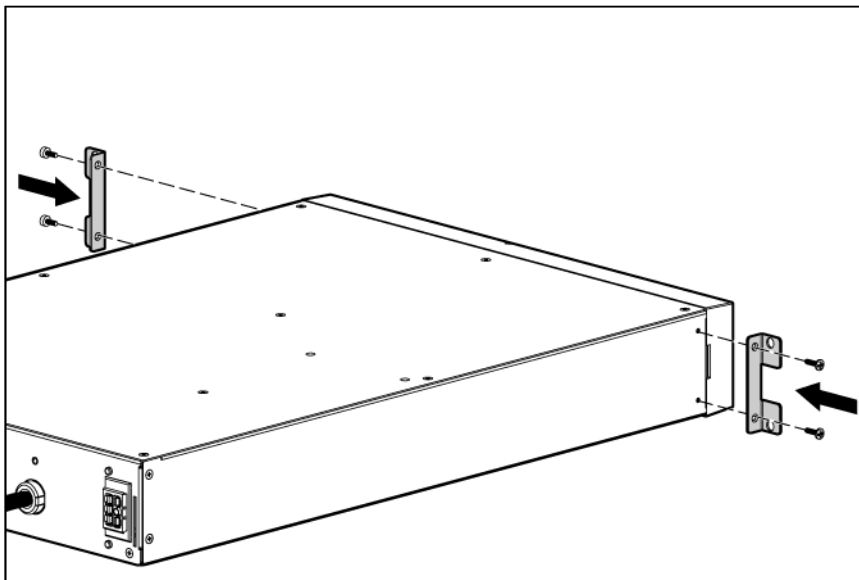
Before installing the unit, review and adhere to all warnings provided in "Precautions (on page 13)."



**WARNING:** A risk of personal injury or damage to the equipment exists. Uneven loading of equipment in the rack might cause the rack to become unstable. Install the heavier components first, and then continue to populate the rack from the bottom to the top.

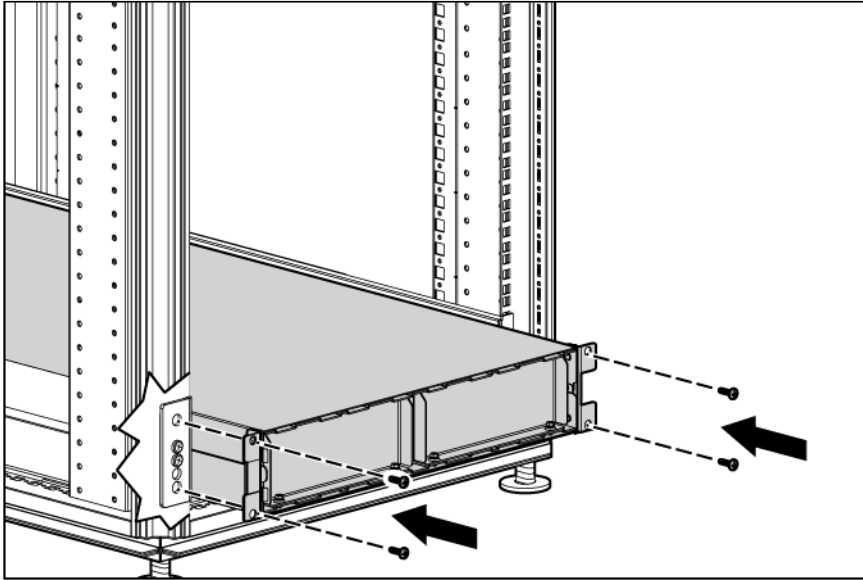
---

1. Install the mounting rails.
2. Install the mounting ears on the chassis using the screws provided.

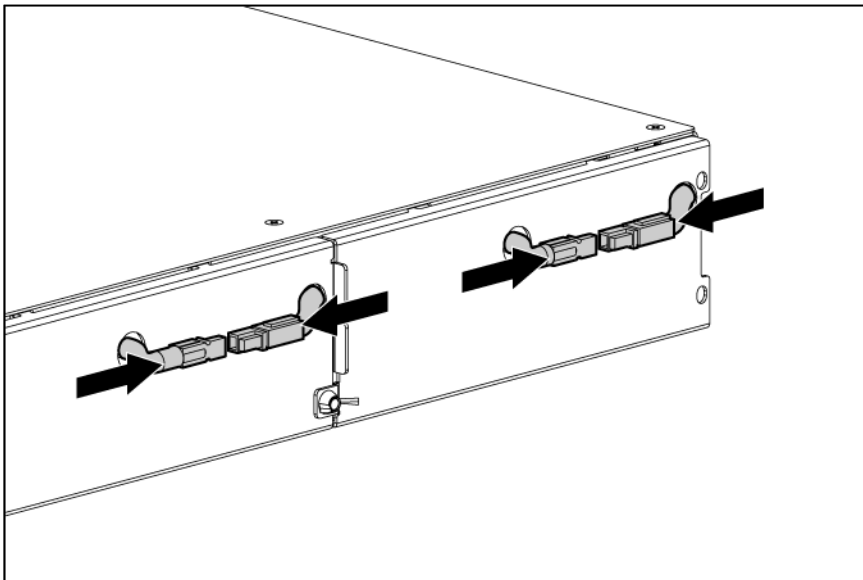


3. With one person on each side, lift the chassis to rail level and slide the chassis on the mounting rails.

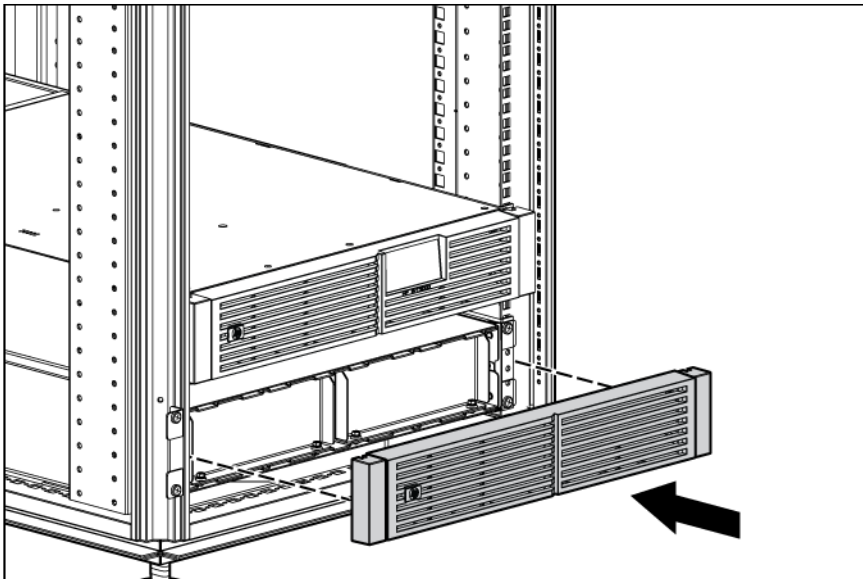
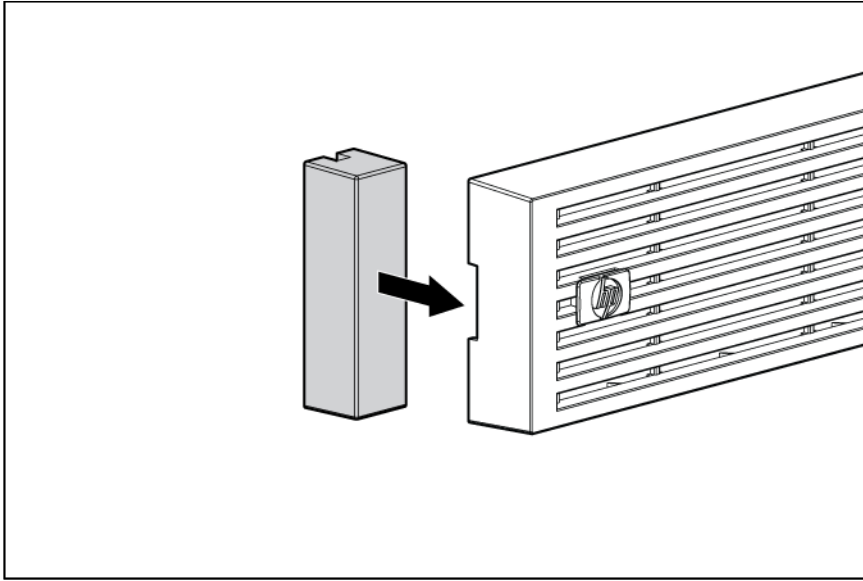
4. Attach the chassis to the rack using the supplied screws.



## Connecting the battery leads

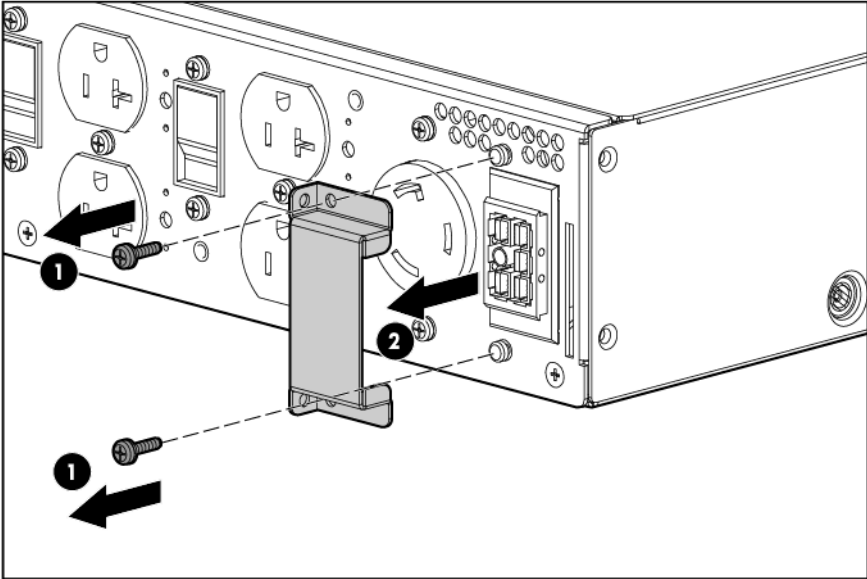


## Attaching the ERM front bezel

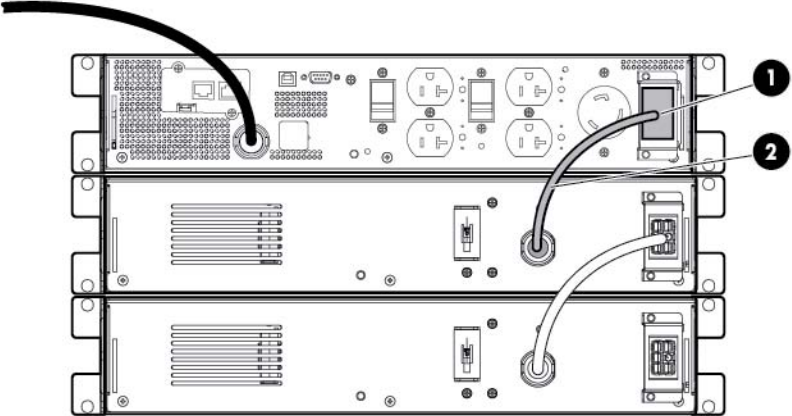


# Connecting the ERM to the UPS

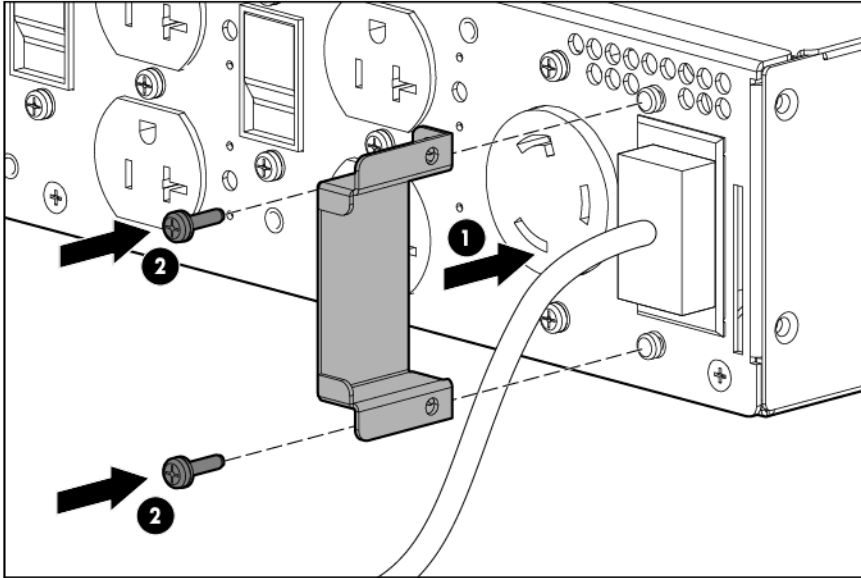
- 1. Remove the screws, and then remove the ERM connector bracket from the UPS.



- 2. Connect the ERM cable (2) in the socket (1) at the rear of the UPS.

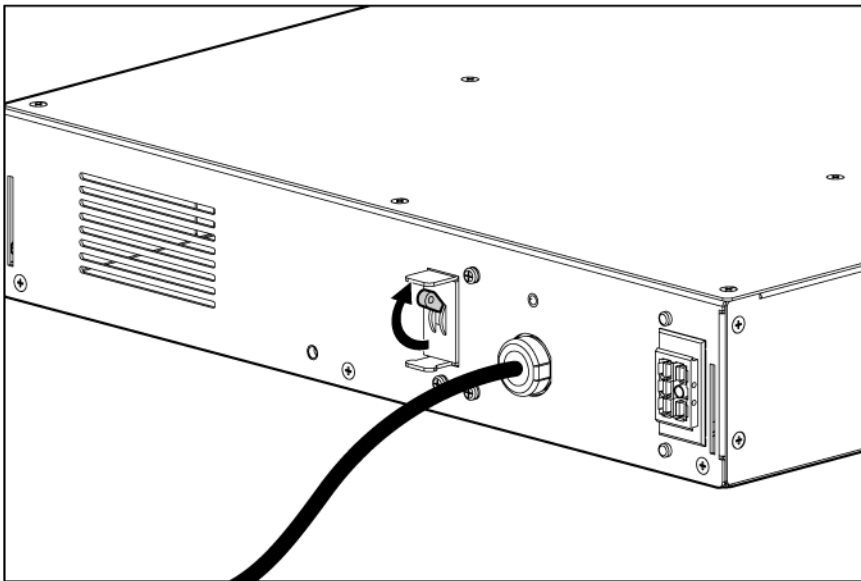


3. Attach the ERM connector bracket to the UPS as a cord retention bracket for the ERM cable.



4. To install a second ERM:
  - a. Remove the ERM connector bracket from the first ERM.
  - b. Connect the cable from the second ERM into the socket at the rear of the first ERM. Up to two ERM units can be connected.
  - c. Attach the ERM connector bracket to the first ERM as a cord retention bracket for the ERM cable.

## Switching on the ERM circuit breaker



## Charging the ERM batteries

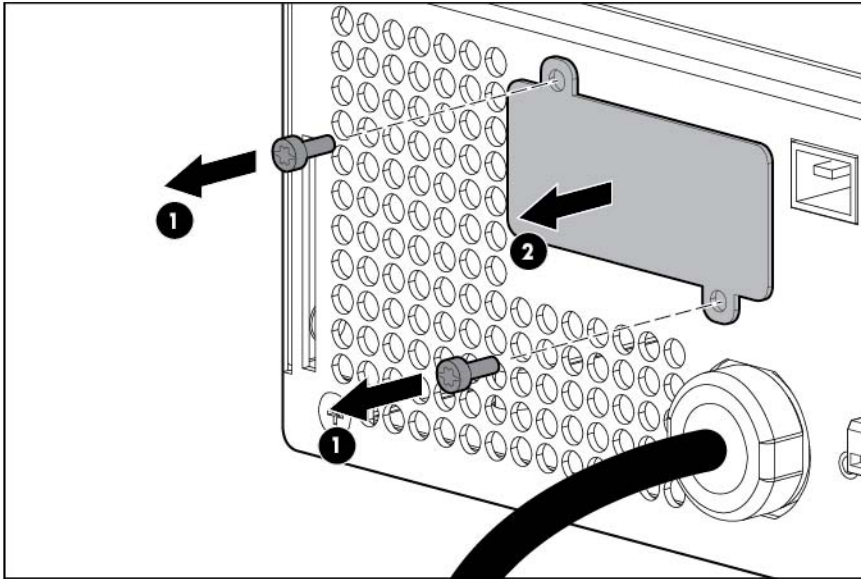
Connect the UPS to a grounded utility power outlet. When the UPS is plugged in, the unit automatically enters Standby mode and begins charging the ERM batteries. Allow 48 hours for the ERM to fully charge.

# Installing the optional UPS Network Module

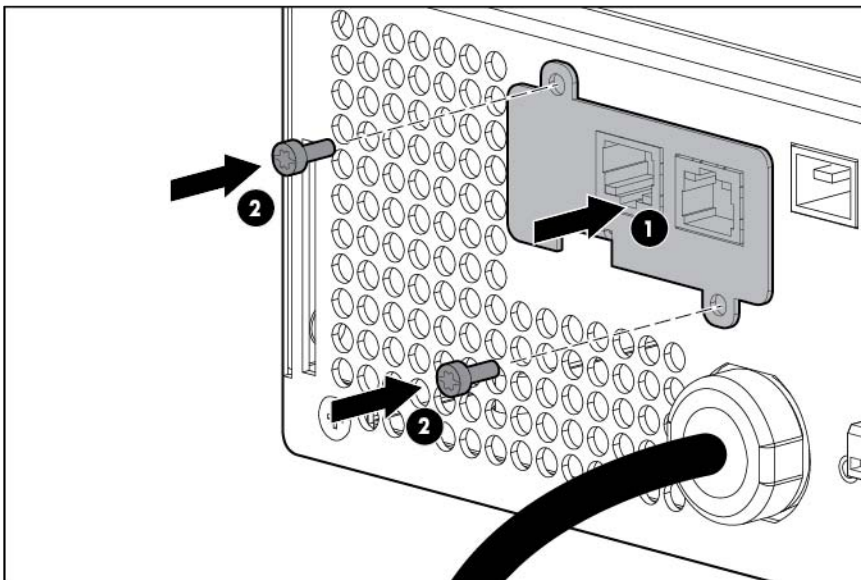
**NOTE:** It is not necessary to power down the UPS before installing the UPS Network Module.

You can purchase the optional UPS Network Module by ordering part number AF465A.

1. Remove the two screws securing the UPS option slot cover plate, and then remove the cover plate.

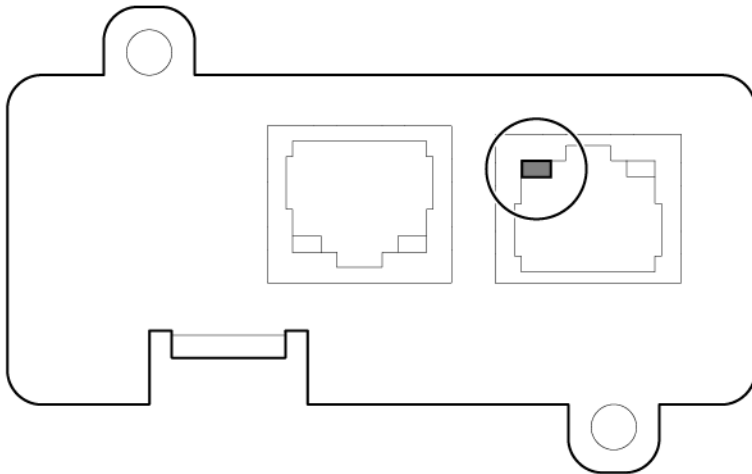


2. Install the UPS Network Module along the alignment channels in the option slot.



3. Secure the UPS Network Module using the two screws removed in step 1.

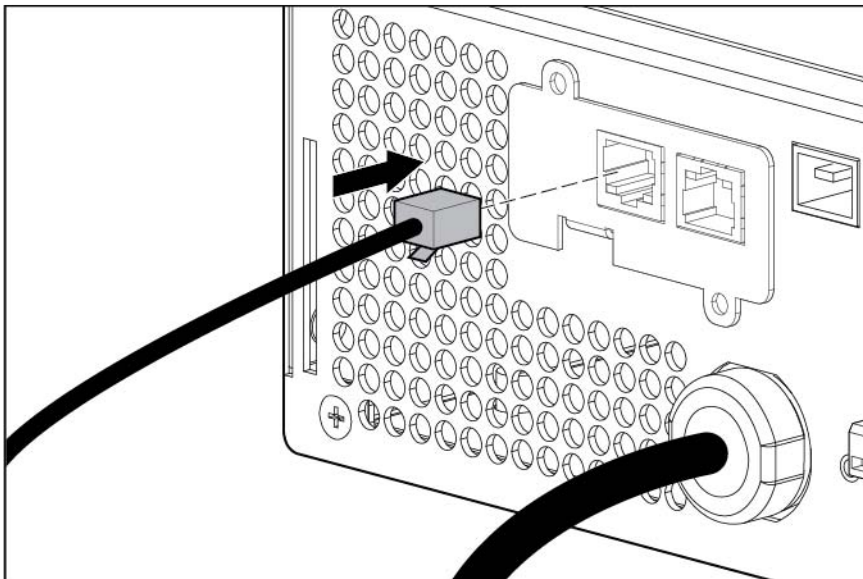
4. If the UPS is powered up, you can be sure that the UPS Network Module is seated properly and communicating with the UPS by verifying that the UPS Data LED illuminates solid green, and then flashes regularly after 2 minutes.



## Connecting the UPS Network Module

The UPS Network Module is provided to manage the attached servers. RJ 45 network patch panel cables are required to use this card.

The RJ 45 network patch panel cables are not included.



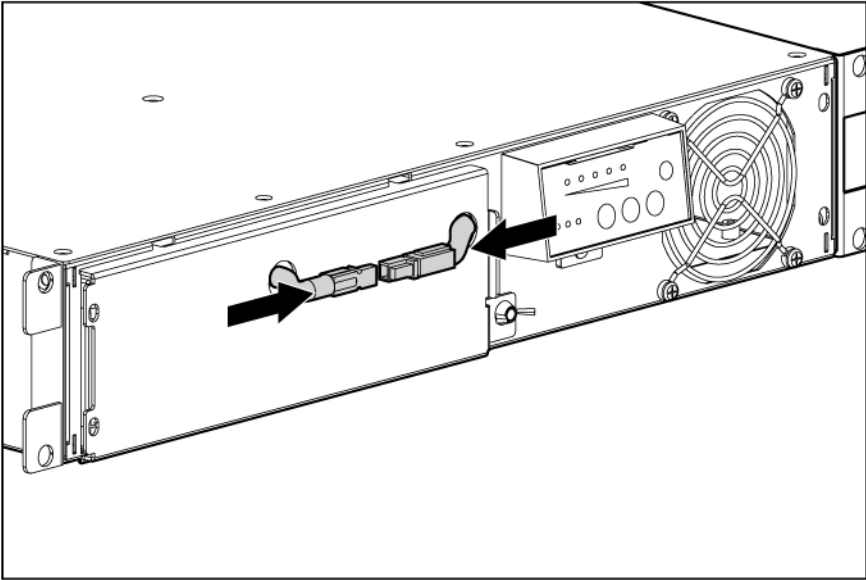
## Installing the UPS as a tower

Before installing the unit, review and adhere to all warnings provided in "Precautions (on page 13)."



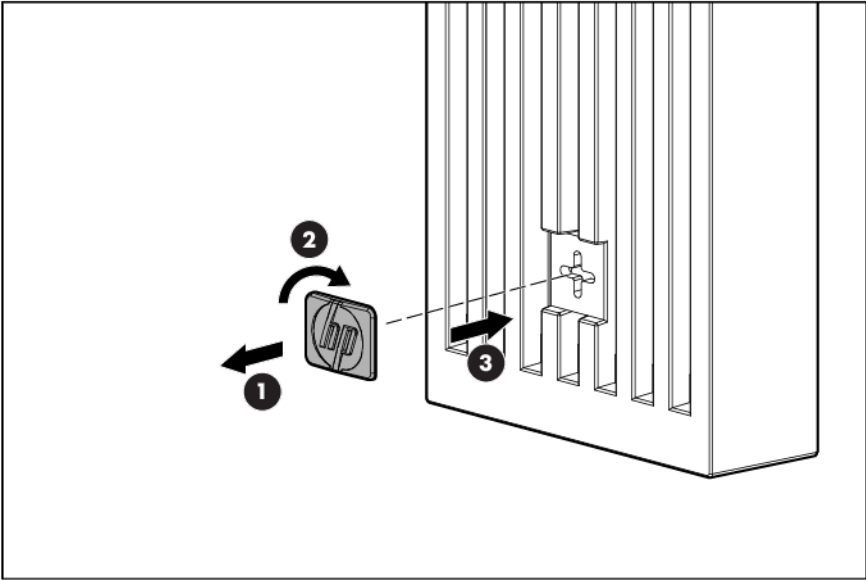
# Connecting the battery leads

**⚠ WARNING:** To prevent personal injury from electric shock or damage to the equipment, remove the battery lead labels, and verify that the ERM circuit breakers are in the Off position.

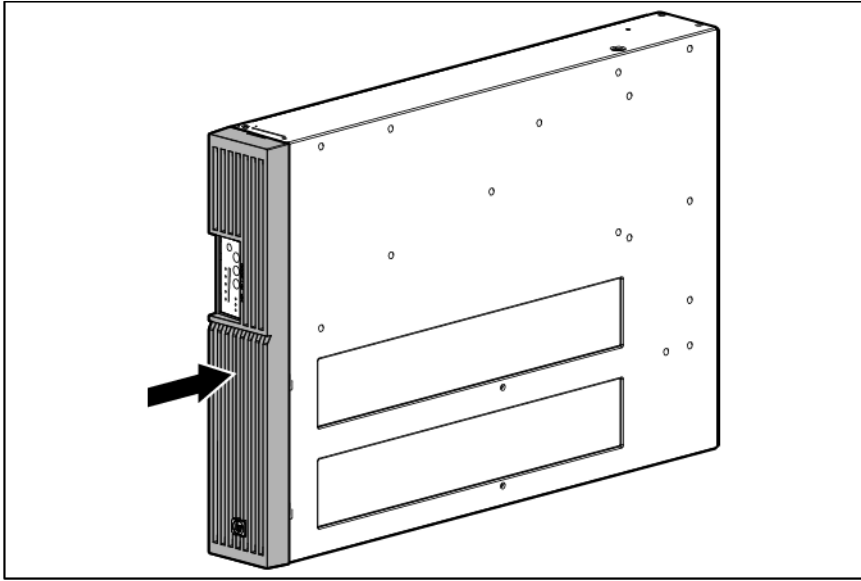


# Rotating the logo badge

Gently pull out the logo badge, rotate it 90 degrees, and then replace it in the bezel.



## Attaching the UPS front bezel

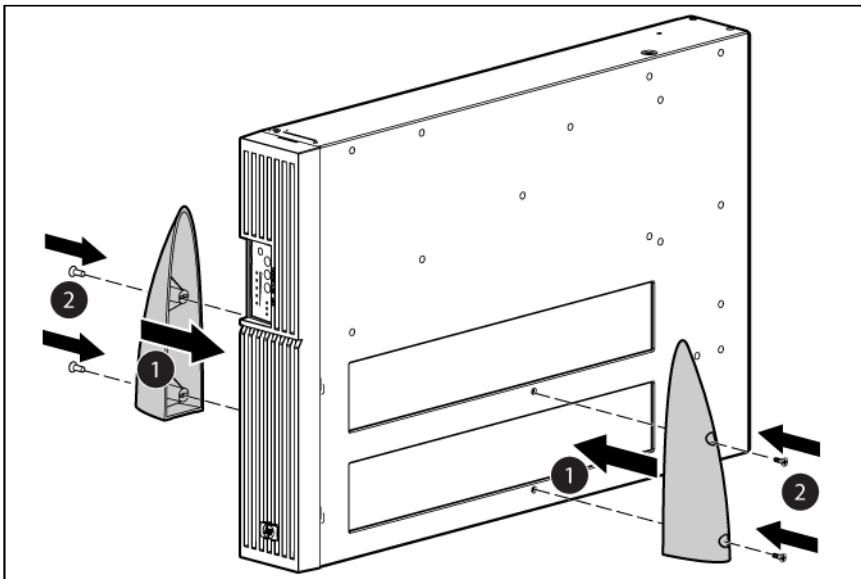


## Attaching the tower conversion stands



**WARNING:** To reduce the risk of personal injury or damage to the equipment, the tower conversion stands must be properly attached when the unit is installed as a tower.

Using the preinstalled screws, attach the tower conversion stands to the unit.



## Continuing the installation

To continue the UPS installation, follow the instructions starting with "Connecting the serial communications port (on page 21)."

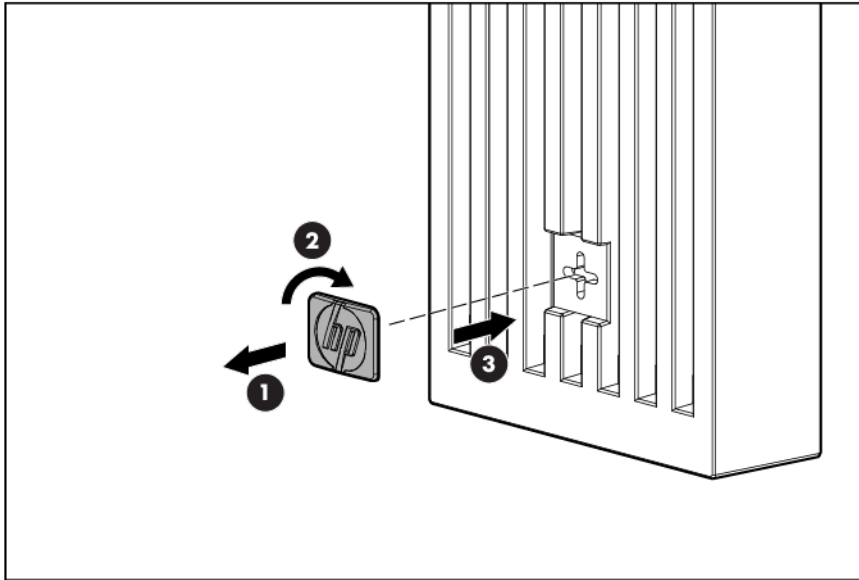
# Installing the ERM as a tower

Before installing the unit, review and adhere to all warnings provided in "Precautions (on page 13)."

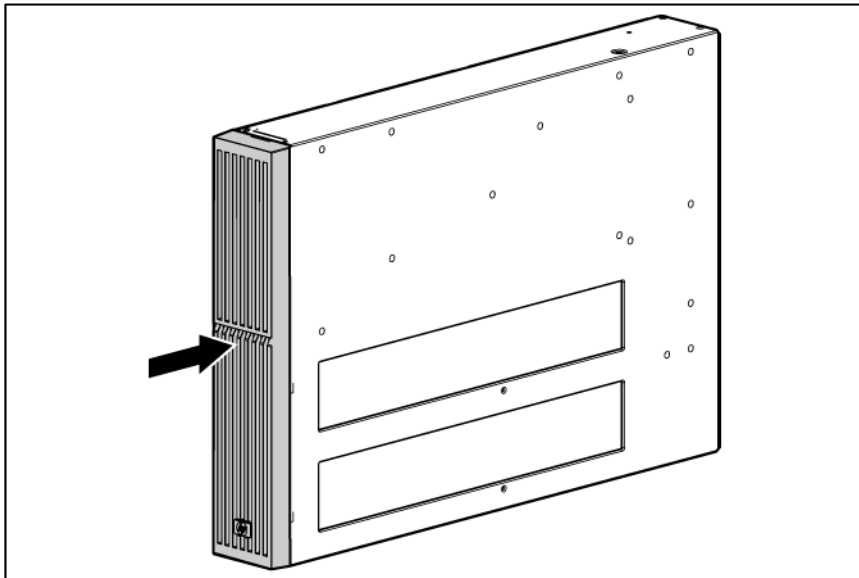
The tower stands and associated hardware ship with the UPS.

## Rotating the logo badge

Gently pull out the logo badge, rotate it 90 degrees, and then replace it in the bezel.



## Attaching the ERM front bezel

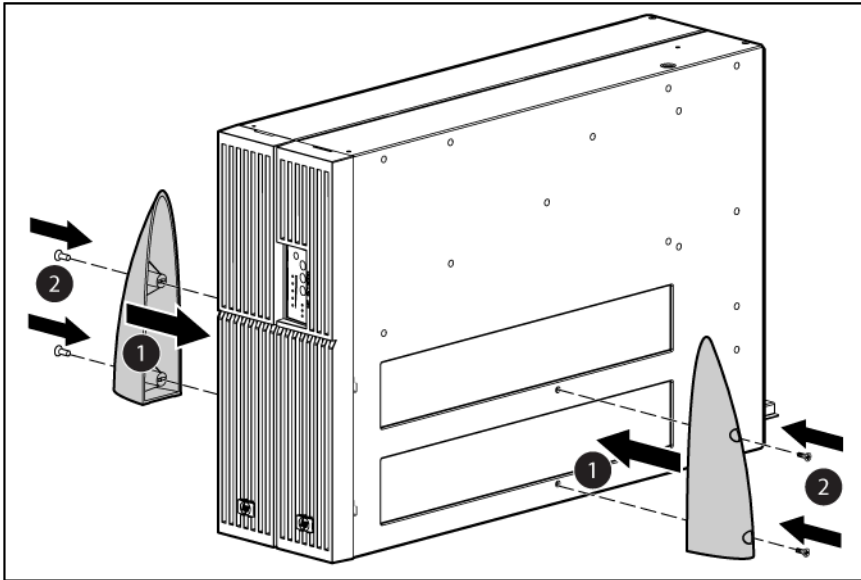


## Attaching the tower conversion stands

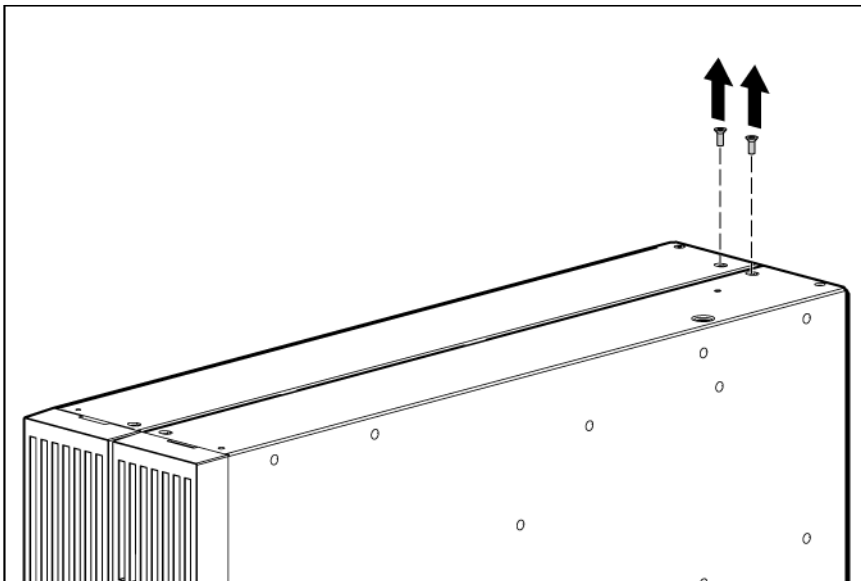


**WARNING:** To reduce the risk of personal injury or damage to the equipment, the tower conversion stands must be properly attached when the unit is installed as a tower.

1. Using the preinstalled screws, attach the tower conversion stands to the unit.

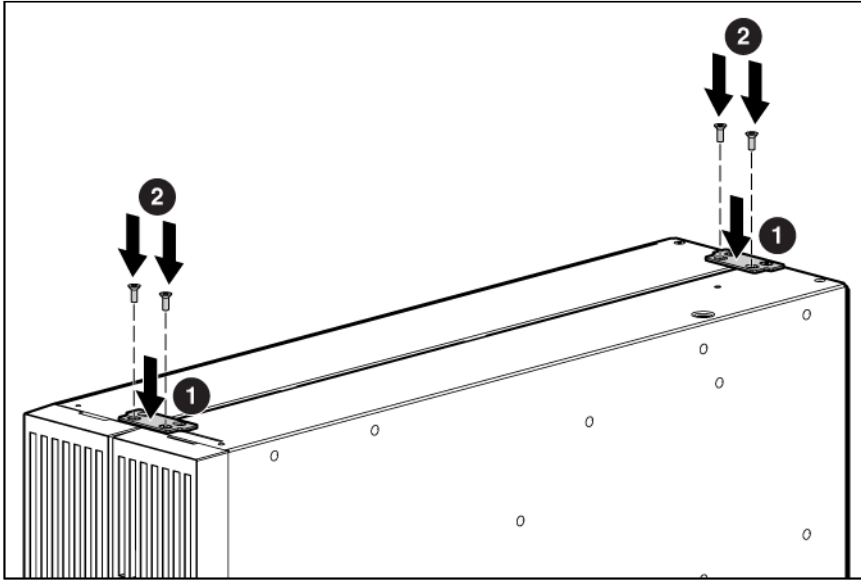


2. Remove a screw from the inner-most, rear corner of the UPS and ERM.



3. To attach the tower brackets:
  - o For the front bracket, use the mounting ear screws.

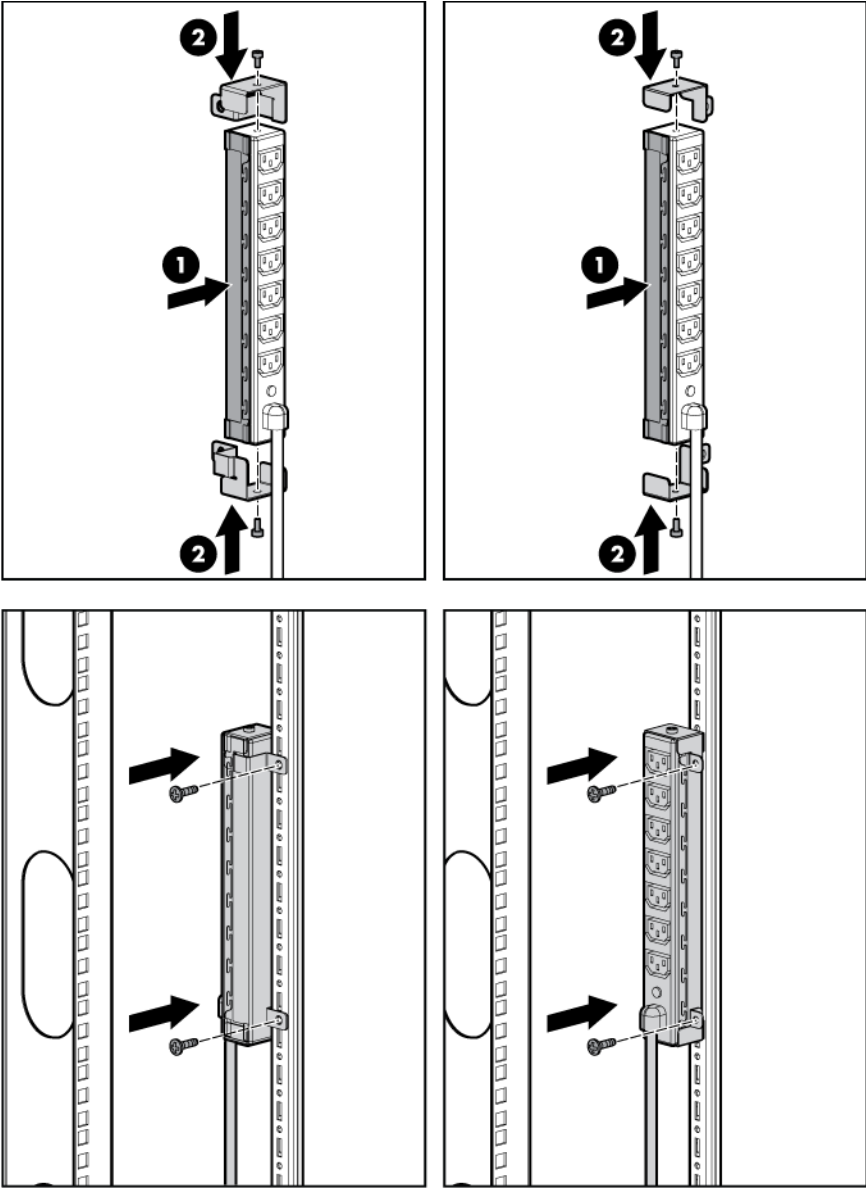
- For the rear bracket, use the screws removed from the chassis.



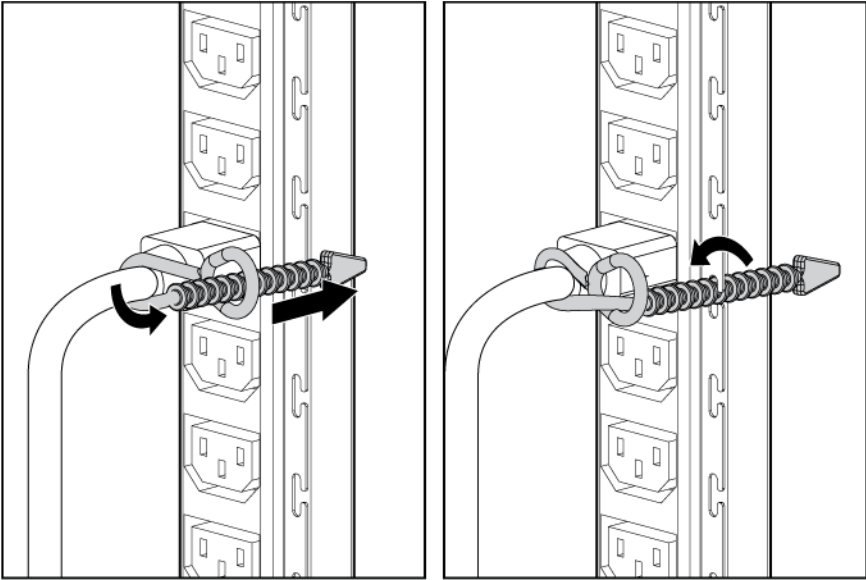
## Continuing the ERM installation

To continue the ERM installation, follow the instructions starting with "Connecting the ERM to the UPS (on page [29](#))."

# Installing the extension bars (if included)



# Connecting and securing the power cords



---

# UPS operations

## Modes of operation

The UPS has five modes of operation:

- Standby mode (on page 40)
- Operate mode (on page 40)
- Configure mode (on page 41)
- Battery mode (on page 41)
- Auto-Bypass mode (on page 41)

## Standby mode

In Standby mode:

- No power is available at the UPS output receptacles.
- The UPS charges the batteries as necessary.

The UPS can be placed in Standby mode when the UPS is in Operate mode (on page 40).

To place the UPS in Standby mode, press and hold the Off button until the audible alarm sounds and the Utility LED flashes. Power to the load ceases.

When fault conditions occur in Standby mode, the UPS enters Converter Off mode ("UPS is in Converter Off mode" on page 57).



---

**IMPORTANT:** While in Standby mode, the UPS maintains the charge on the batteries, but no power is available at the output receptacles. The UPS remains in Standby mode until an alternate mode is selected or until utility power is removed.

---

For the location of buttons, see "UPS front panel controls (on page 8)."

For the location of LEDs, see "UPS front panel LED indicators (on page 8)."

## Operate mode

In Operate mode:

- Power is available at the UPS receptacles.
- The UPS charges the batteries as necessary.

The UPS can be placed in Operate mode if the UPS is powered up and in Standby mode (on page 40).

To place the UPS in Operate mode, press the On button. The Utility LED illuminates, indicating that power is available at the UPS output receptacles. The UPS acknowledges compliance with a short beep.

If the UPS is off (no LEDs are illuminated), press the On and Battery Start buttons simultaneously to start the UPS on battery power.



For the location of buttons, see "UPS front panel controls (on page 8)."

For the location of LEDs, see "UPS front panel LED indicators (on page 8)."

## Configure mode

The UPS can be placed in Configure mode while in Operate mode (on page 40), Battery mode (on page 41) or Standby mode (on page 40).

In Configure mode:

- Power is available at the UPS receptacles when entered from Operate mode. Power is not available at the receptacles when entered from Standby mode.
- The UPS charges the batteries as necessary.
- The UPS configuration can be updated.

To place the UPS in Configure mode, press and hold the On and Test/Alarm Reset buttons simultaneously for 3 seconds. The Load Level indicators flash briefly, and then display the enabled options.

For the location of buttons, see "UPS front panel controls (on page 8)."

For the location of LEDs, see "UPS front panel LED indicators (on page 8)."

## Battery mode

When utility power is lost, the UPS automatically transfers from Operate mode (on page 40) to Battery mode.

In Battery mode, the UPS supplies power without being connected to utility power. When utility power becomes available, the UPS returns to Operate mode.

After the UPS is initially connected to utility power, it can be started on battery power thereafter. To start the UPS in Battery mode (no utility power present), press and hold the On and Battery Start buttons simultaneously for three seconds.

## Auto-Bypass mode

The UPS automatically enters Auto-Bypass mode when one of the following conditions occurs:

- The power from the UPS reaches a percentage greater than 110 percent for more than 10 cycles or between 103 percent and 110 percent for more than 30 seconds.
- The UPS detects an overtemperature condition (on page 59).
- The UPS detects a fan failure.
- There is an internal UPS failure while in Operate mode (on page 40).

All internal faults transfer the UPS to either Auto-Bypass or Converter Off mode ("UPS is in Converter Off mode" on page 57), depending on whether the load is being powered at the time the fault is detected. The UPS can be forced to Converter Off mode from Auto-Bypass mode by pressing the Off button, and can be sent back to Auto-Bypass mode by pressing the On button.

## Operating the UPS front panel controls

**NOTE:** If the On and Off buttons are simultaneously pressed, the Off button has priority over the On button.

Button	Assertion time	Audible alarm	Mode before assertion	Utility present ?	Action
On	0.5 seconds	Every 0.5 seconds until the button is released	Standby	Yes	Energizes the load and resets the bypass entry count to 0
			Operate	Yes	Resets the bypass entry count to 0
			Auto-Bypass	Yes	Clears the UPS On audible alarms, resets the bypass entry count to 0, and attempts to transfer to Operate mode
			Converter Off	Yes	Clears the UPS On audible alarms, resets the bypass entry count to 0, and attempts to transfer to Operate mode
Off	3 seconds	Every 0.5 seconds until the button is released	Operate	Yes	Transfers to Standby mode, and power to the load ceases
			Standby	Yes	No action
			Battery	No	Powers down the UPS, and power to the load ceases
			Auto-bypass	Yes or No	Transfers to Standby mode or Converter Off mode, and power to the load ceases
Self Test	0.5 seconds		Any	Yes or No	Silences audible alarms after 0.5 seconds
	3 seconds	Continuously	Any	Yes or No	Initiates a self-test
Battery Start	0.5 seconds		Any	Yes or No	No action
Battery Start and On	3 seconds	Continuously	UPS off	No	Transfers to battery power, and begins powering the load
On and Self Test	3 seconds	Continuously	Any	Yes or No	Enters or exits Configuration mode

## Configuring the UPS

The UPS automatically detects the number of ERMs connected.

In Configure mode, the LED front panel display changes function to enable modification of the UPS parameters. Each LED is associated with a different parameter.

Available settings	Parameter	Associated LED	Explanation (when LED is illuminated)
<b>Nominal voltage setting</b>	100/204 Nom	Self Test	Nominal output voltage is 100 V for a low voltage model and 204 V for a high voltage model

Available settings	Parameter	Associated LED	Explanation (when LED is illuminated)
	110/220 Nom	Battery Fault	Nominal output voltage is 110 V for a low voltage model and 220 V for a high voltage model
	120/230 Nom	Site Wiring Fault	Nominal output voltage is 120 V for a low voltage model and 230 V for a high voltage model
	127/240 Nom	Overtemperature	Nominal output voltage is 127 V for a low voltage model and 240 V for a high voltage model
<b>Wiring fault setting</b>	Wiring fault	Overload	Audible alarm will sound when ground is missing or line and neutral connections are reversed

---

**NOTE:** For high voltage UPSs, the Site Wiring Fault function is disabled by default, but can be manually enabled.

---

To change the UPS configuration parameters:

1. Place the UPS in Configure mode (on page 41).  
The LEDs associated with the currently configured parameters illuminate. A flashing cursor indicates where you are in the configuration process as you scroll through the available settings.
2. Press the On button to scroll through the options. Each time the On button is pressed, the audible alarm sounds.
3. If the On button is pressed and the UPS does not respond, the UPS is in Operate mode (on page 40). Start over with step 1.
4. Press the Off button once to toggle the selected option on or off.
5. Repeat steps 2 and 3 for each option.
6. To save the configuration settings and exit Configure mode, press and hold the Test/Alarm Reset button for 3 seconds.

---

**NOTE:** Configure mode times out after 2 minutes of inactivity. If the Test/Alarm Reset button has not been pressed, any new selections are not saved.

---

For the location of buttons, see "UPS front panel controls (on page 8)."

For the location of LEDs, see "UPS front panel LED indicators (on page 8)."

## Initiating a self-test

To initiate a self-test, press and hold the Test/Alarm Reset button ("UPS front panel controls" on page 8) for three seconds.

If the UPS detects a problem, the appropriate LED ("UPS front panel LED indicators" on page 8) illuminates and an audible alarm may sound.

For information on what to do if the self-test detects a problem, see "Troubleshooting (on page 55)."

# Silencing an audible alarm

To silence an alarm, press the Test/Alarm Reset button ("[UPS front panel controls](#)" on page 8).



---

**IMPORTANT:**

- Although the audible alarm silences, the condition that caused the alarm to sound may still exist.
  - If a utility power failure caused the alarm, the alarm silences after power is restored.
- 

For information about audible alarm conditions, see "LED and audible alarm troubleshooting ("[LED troubleshooting](#)" on page 55)."

# Verifying the REPO port connection

---

**NOTE:** While testing, operate connected equipment in a safe test mode so the effects do not disrupt critical operations.

---

After connecting the REPO port (on page 21):

1. Initiate a REPO by closing the REPO contact.

The Self Test, Battery Fault, Site Wiring Fault, Overtemperature, Overload, and Utility LEDs flash.



---

**CAUTION:** If the polarity is reversed while connecting the REPO port, the UPS powers up normally.

---

2. Verify proper connection of the REPO port:
  - a. Power up the UPS ("[Starting power to the load](#)" on page 26).
  - b. Disconnect the REPO port.
  - c. Reconnect the REPO port.

If the polarity is correct, the REPO connectors can be disconnected, and then reconnected, without initiating a REPO.
  - d. Verify that the UPS remains in Operate mode (on page 40).
  - e. If a REPO is initiated, the polarity is reversed. Check and correct the connections.

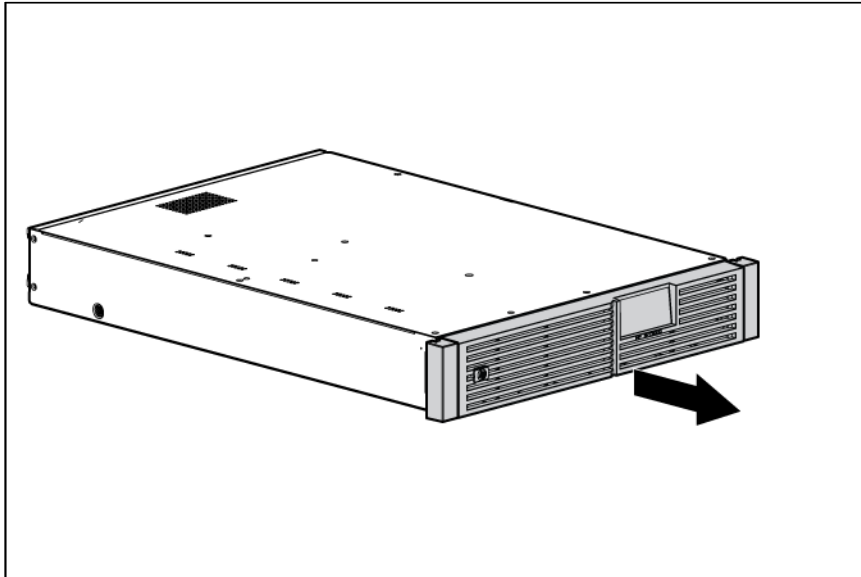
# Powering down the UPS

1. Shut down all load devices.
2. Press the Off button to take the UPS out of Operate mode. Power to the load receptacles ceases. The On Battery LED and Load Level indicator flash.
3. Disconnect the UPS from utility power.
4. Wait at least 60 seconds for the UPS internal circuitry to discharge.

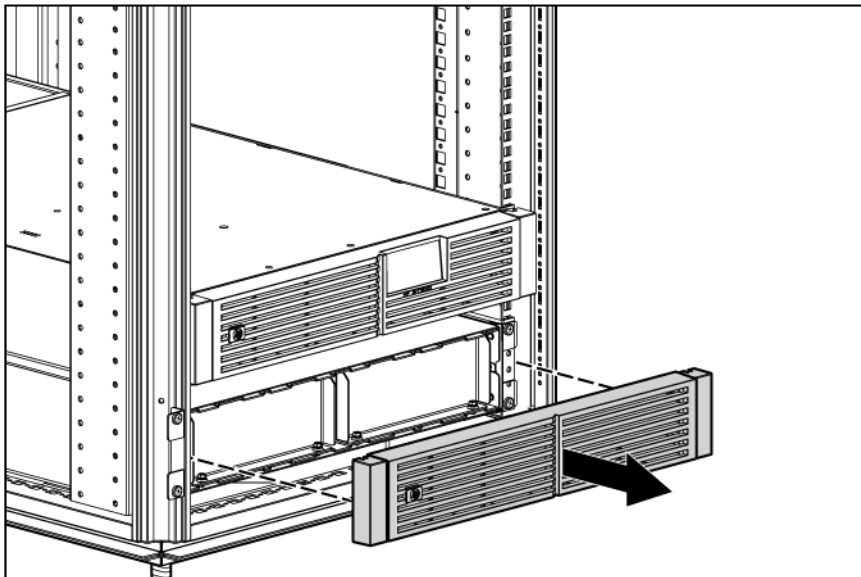
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# Maintenance

## Removing the UPS front bezel



## Removing the ERM front bezel



## Replacing the batteries

To replace the batteries:

1. Read and observe the requirements in "Important battery safety information (on page 46)" and "Battery care and storage guidelines (on page 46)."
2. Follow the instructions in "UPS battery replacement procedure (on page 47)."

## Important battery safety information



**WARNING:** The unit contains sealed lead-acid battery modules. To prevent fire or chemical burns:

- Do not attempt to recharge batteries after removal from the unit.
- Do not disassemble, crush, or puncture the batteries.
- Do not short the external contacts of the batteries.
- Do not immerse the batteries in water.
- Do not expose to temperatures higher than 60°C (140°F).



**WARNING:** To prevent personal injury from hazardous energy:

- Remove watches, rings, or other metal objects.
- Use tools with insulated handles.
- Do not place tools or metal parts on top of batteries.



**WARNING:** To prevent personal injury, prepare the area and observe all materials-handling procedures when transporting a battery module. Battery modules weigh 20 kg (44.1 lb).

**NOTE:** Replace all battery modules at the same time.

## Battery care and storage guidelines

- Minimize the amount of time the UPS uses battery power by matching the UPS configuration with the utility voltage. Refer to "Configuring the UPS (on page 42)."
- Keep the area around the UPS clean and dust-free. If the environment is very dusty, clean the outside of the UPS regularly with a vacuum cleaner.
- Maintain the ambient temperature at 25°C (77°F).
- If storing a UPS for an extended period, recharge the batteries every 6 months:



**CAUTION:** Because of the short shelf life of the batteries, avoid storing a battery spare as a backup. Do not maintain an inventory of spare batteries on site unless a procedure to keep these batteries charged while in storage is implemented.

- a. Connect the UPS to utility power.
- b. Allow the UPS to remain in Standby mode.
- c. Allow the UPS to charge the batteries for at least 24 hours.
- d. Update the battery recharge date label.

## Determining when to replace batteries

When the Battery Fault LED illuminates, batteries might need to be replaced within 30 to 60 days.

When a battery alarm sounds, initiate a UPS battery self-test to verify that battery replacement is required. If the Battery Fault LED remains illuminated, replace the batteries as soon as possible.

For more information on initiating a self-test, see "Initiating a self-test (on page 43)."

For the location of LEDs, see "UPS front panel LED indicators (on page 8)."

## Obtaining new batteries

New batteries might be required within 30 to 60 days when the Battery Fault LED illuminates red. Obtain spare batteries for the UPS when this occurs.

Spare battery modules are available for this UPS. The UPS spare battery kit part number is 517703-001.

- ⚠ **CAUTION:** Because of the short shelf life of the batteries, avoid storing a battery spare as a backup. Do not maintain an inventory of spare batteries on site unless a procedure to keep these batteries charged while in storage is implemented.

## UPS battery replacement procedure

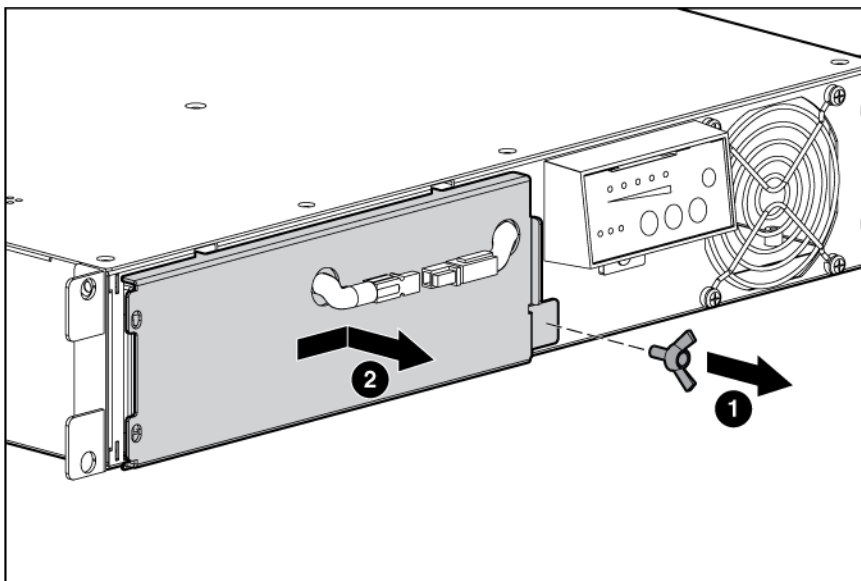
- ⚠ **WARNING:** To prevent personal injury from electric shock or damage to the equipment, remove the battery lead labels, and verify that the ERM circuit breakers are in the Off position.

This component is hot-swappable and can be replaced without powering down the UPS.

1. (optional) To replace the component with the UPS powered down, refer to "Powering down the UPS (on page 44)."

- ⚠ **CAUTION:** When hot-swapping batteries, the UPS is not protected in the event of a utility power failure.

2. Remove the UPS front bezel ("Removing the UPS front bezel" on page 45).
3. Disconnect the battery leads.
4. Remove the UPS battery bracket.



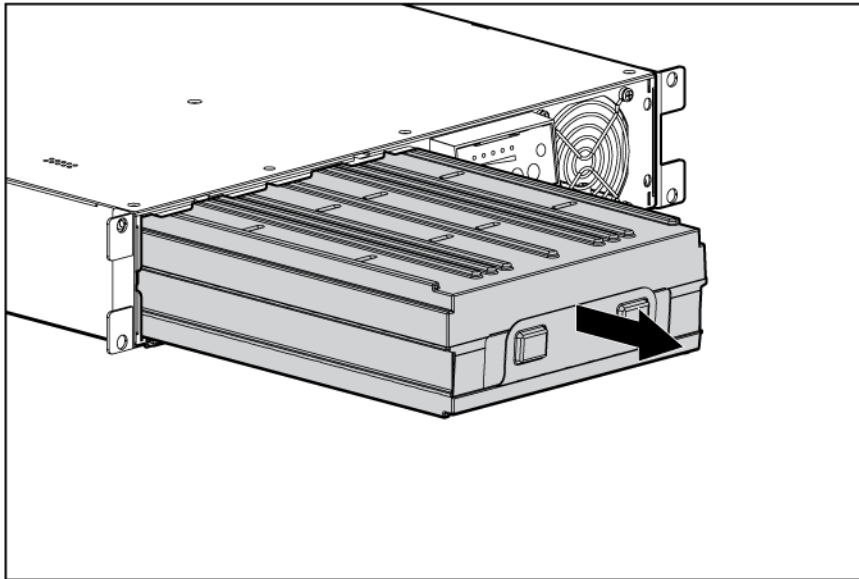
5. Remove the UPS battery modules.



---

**IMPORTANT:** Do not pull the battery leads when removing or installing the batteries.

---



To replace the components, reverse the removal procedure.



---

**IMPORTANT:** Charge the batteries for at least 24 hours before supplying backup power to devices. The batteries charge to:

- 80 percent of their capacity within 3 hours
  - 100 percent of their capacity within 48 hours
- 

## Testing the new battery module

After installing the new battery module, press the Test/Alarm Reset button to initiate a self-test ("Initiating a self-test" on page 43).



---

**IMPORTANT:** The UPS does not execute a self-test until the batteries are 90 percent charged.

---



---

**IMPORTANT:** Charge the batteries for at least 24 hours before supplying backup power to devices. The batteries charge to:

- 80 percent of their capacity within 3 hours
  - 100 percent of their capacity within 48 hours
- 

If the installation has been successful, the Battery Fault LED is not illuminated. If the installation has not been successful, the Battery Fault LED illuminates. If this occurs, repeat the UPS battery replacement procedure (on page 47), and check the battery terminal connections. If the Battery Fault LED is still illuminated, see "LED and audible alarm troubleshooting ("LED troubleshooting" on page 55)."

For the location of buttons, see "UPS front panel controls (on page 8)."

For the location of LEDs, see "UPS front panel LED indicators (on page 8)."



# Replacing the UPS

To remove the UPS:

1. Power down all attached load devices.
2. Power down the UPS ("[Powering down the UPS](#)" on page 44).
3. Switch the circuit breaker for any attached ERMs to the Off position.
4. Unplug the UPS power cord.
5. Disconnect the communications cable from the option card.
6. Disconnect the ground bonding cable.
7. Disconnect the REPO port.
8. Unplug the load devices.
9. Unplug the ERM connected to the UPS.
10. Remove the UPS front bezel ("[Removing the UPS front bezel](#)" on page 45).
11. Disconnect the battery leads.
12. Remove the UPS battery bracket.
13. Remove the UPS battery modules.
14. Remove the screws securing the UPS to the rack.
15. Remove the UPS from the rack.

To replace the component, reverse the removal procedure.

# Replacing the ERM

To remove the ERM:

1. Switch the circuit breaker for any attached ERMs to the Off position.
2. Unplug the ERM from the back of the UPS.
3. Unplug the ERM from a second connected ERM.
4. Remove the front bezel ("[Removing the ERM front bezel](#)" on page 45) on the ERM that is being replaced.
5. Disconnect the battery leads.
6. Remove the screws securing the ERM to the rack.
7. Remove the ERM from the rack.

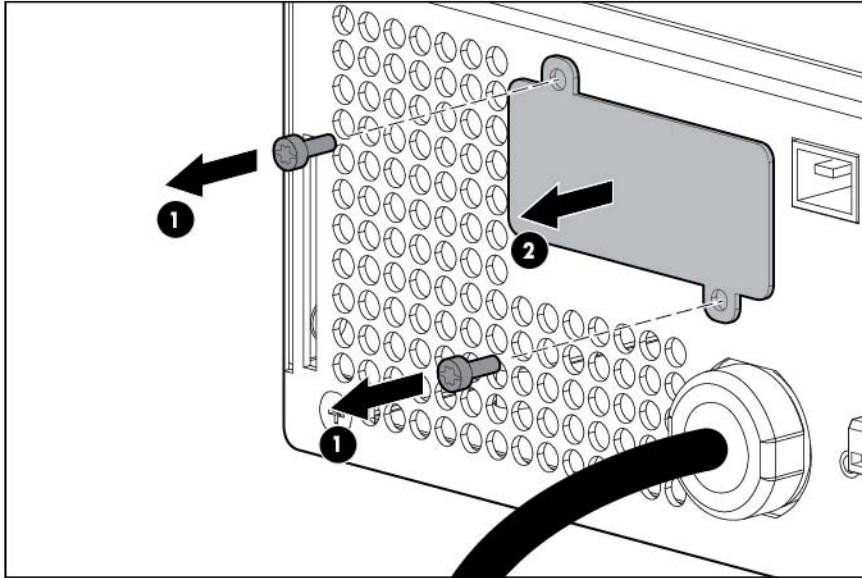
To replace the component, reverse the removal procedure.

# Replacing the UPS option card

This component is hot-swappable and can be replaced without powering down the UPS.

1. (optional) To replace the component with the UPS powered down, refer to "[Powering down the UPS](#) (on page 44)."
2. Disconnect the communications cable from the option card.

3. Remove the two screws securing the option card and slide the card out.



To replace the component, reverse the removal procedure.

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**NOTE:** Replacing the option card might require power protector software to be restarted or reconfigured.

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## Updating the UPS firmware

To update the UPS firmware, see the HP website (<http://www.hp.com/go/rackandpower>).

## Configuring a USB to serial converter

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**NOTE:** This procedure was tested on the Windows® XP Professional, Windows Server® 2003, and Windows® Vista Enterprise operating systems using the HP USB to serial converter (part number 304098-001). Depending on your system configuration, a driver download might be required to successfully install the converter. The driver can be downloaded from the USB-Drivers website (<http://www.usb-drivers.com/drivers/123/123294.htm>).

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To configure a USB port to the COM 1 port on systems that do not have available serial ports:

1. Connect the USB to serial converter to the USB port on your system.
2. For Windows Vista, click **Start**, select **Control Panel**, double-click **System and Maintenance**, and then skip to step 4.  
-or-  
For Windows XP, click **Start**, select **Control Panel**, click **Performance and Maintenance**, and then click **System**.  
-or-  
For Windows Server, click **Start**, select **Control Panel**, and then double-click **System**.
3. Click the **Hardware** tab.
4. Click **Device Manager**. The Device Manager screen appears.

5. In the tree displayed in the left panel, click the **Ports (COM & LPT)** branch to expand.
6. Double-click the port that is assigned to your USB to serial converter device. This port is usually named with the device manufacturer's name followed by one of the following:
  - o USB to Serial Bridge (COM 4)
  - o USB Serial port
  - o Communications Port (COM1)The Port Properties screen appears.
7. Click the **Port Settings** tab. The Port Settings screen appears.
8. Click **Restore Defaults**. The following default settings appear:
  - o Bits per second: 9600
  - o Data Bits: 8
  - o Parity: None
  - o Stop bits: 1
  - o Flow control: None
9. Click **Advanced**. The Advanced Settings screen appears.
10. From the COM Port Number drop down menu, select **Com 1** for the USB port number, and then click **OK**.

If COM 1 is being used by another USB port, the following message appears:

This COM name is being used by another device. Using duplicate names can lead to inaccessible devices and changed settings. Do you want to continue?

If this message appears, click **YES**. It might be necessary to disable the program accessing COM 1.

  - a. Click **OK**.
  - b. For Windows Vista, skip to step 13.
11. For Windows Server, reduce the Receive Buffer and Transmit Buffer to the low setting by scrolling down to select **low (1)**.
12. Be sure that the **Use FIFO buffers (requires 16550 compatible UART)** checkbox is selected.

For Windows XP, the USB settings might be different. Choose the lowest, most dependable Receive and Transmit buffers by using the list menus, radio buttons, or other selection methods.
13. Click **OK** to close the Advanced screen.
14. Click **OK** to close the Device Manager screen.
15. Run the firmware Flash batch file program. Follow the instructions provided with the program.

## Reassigning the USB COM ports

To reassign a device from COM 1 to another port:

1. From the open Device Manager screen, locate the USB device that is assigned to COM 1.
2. Double-click the port name.

The Port Properties screen appears.
3. Click the **Port Settings** tab.

The Port Settings screen appears.
4. Click **Advanced**.

The Advanced Settings screen appears.

5. Select an available USB port number from the **COM Port Number** drop down menu.
6. Click **OK** to close the Advanced screen.
7. Click **OK** to close the Port Settings screen.
8. Verify that the Device Manager screen shows that the USB to serial converter is assigned to COM 1, and that the other USB device is assigned to a different port.

If the Device Manager screen does not automatically refresh to show the change:

- a. Click **Action**.

The Action Menu appears.

- b. Click **Scan for hardware changes** to refresh the screen and display the changes.

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# Power management

## Power Protector software

HP Power Protector software ensures maximum power reliability of computer systems through comprehensive control of UPSs. The easy-to-use browser interface enables novice users to configure and manage power protection settings. To download the latest version of HP Power Protector software, see the HP website (<http://www.hp.com/go/rackandpower>).

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**NOTE:** To install and configure the software, see the software user guide. The software user guide is available for download from the HP website (<http://www.hp.com/go/rackandpower>).

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HP Power Protector:

- Does not require complex management systems, which simplifies deployment, configuration, and management of UPS-protected environments.
- Manages a graceful shutdown of attached devices during utility power failures.
- Prioritize the shutdown timing of attached computers.
- Customizes alert generation with modifiable dialog boxes, command execution, and email and broadcast messages.
- Monitors the status of the UPS and reports alarms.
- Displays a power log for analysis.
- Manages independent UPS load segments to provide separate power control of attached load devices.

The HP UPS Network Module (P/N AF465A) is a Minislot with an easy-to-use browser interface, which gives you comprehensive control of the UPS and enables you to monitor and effectively manage power environments. The UPS Network Module supports either a single UPS configuration or a dual redundant UPS configuration for no single-point-of-failure.

The UPS Network Module can be configured to send alert traps to HP Systems Insight Manager and other SNMP management programs or used as a stand-alone management system. This flexibility enables you to monitor and manage UPSs through the network. To facilitate day-by-day maintenance tasks, the embedded management software provides detailed system logs.

The UPS Network Module provides remote management of a UPS by connecting the UPS directly to the network. Configuration and management of the UPS from anywhere and at any time through a standard web browser.

The UPS Network Module (Minislot) is ideal for:

- Small to enterprise-sized customers that will benefit from remotely managing their UPS.
- Adding protection via the redundant UPS configuration.
- Gracefully performing scheduled shut-downs of attached equipment.
- Notifying administrative personnel in the event of a power failure.
- Prioritizes the timing of attached load device shutdowns.

- Delays reboot by load segment after a power outage to sequence the startup of system components.

# Troubleshooting

## LED troubleshooting

Utility LED	On Battery LED	On Bypass LED	Self Test LED	Battery Fault LED	Site Wiring Fault LED	Over Temp LED	Overload LED	Condition
On—Load <10%	Off	Off	On—Load >10%	On—Load >25%	On—Load >50%	On—Load >75%	Off	UPS is in Operate mode (on page 40)
Flashing	Off	Off	Off	*	*	*	Off	UPS is in Standby mode (on page 40)
Off	Off	On	On—Load >10%	On—Load >25%	On—Load >50%	On—Load >75%	Off	UPS is in Auto-Bypass mode (on page 41)
Flashing	Flashing	Flashing	Off	Off	Off	Off	Off	UPS is in Converter Off mode (on page 57)
Off	Off	Off	Off	Off	Off	Flashing	Flashing	General alarm condition (on page 57)—UPS is in Auto-Bypass mode
On	Off	Flashing	*	*	*	*	*	Bypass is out of range (on page 58)
*	Off	*	Off	Flashing	*	*	*	Battery condition (on page 58)—Batteries are disconnected or battery test failure
Off	Flashing	Off	Off	Off	Off	Off	Off	Low battery (no utility power) ("UPS is on battery" on page 58)

Off	On	Off	On—Battery capacity <25%	On—Battery capacity >25%	On—Battery capacity >50%	On—Battery capacity >75%	Off	UPS is on battery (on page 58)—No utility power
*	*	*	Off	*	*	Flashing	*	Overtemperature condition (on page 59)
Off	Off	On	Flashing	Flashing	Flashing	Flashing	Flashing	Internal UPS fault condition (on page 59)
Flashing	Off	Off	Flashing	Flashing	Flashing	Flashing	Flashing	REPO condition (on page 59)
*	Off	*	Off	*	Flashing	*	*	Site wiring condition (on page 59)
*	Off	*	On	On	On	On	Flashing	Overload condition (on page 59)—UPS power capacity is exceeded with no other faults
*	Off	*	Off	*	*	*	Flashing	Overload condition (on page 59)—UPS power capacity is exceeded while other faults exist
Off	On	Off	On—Battery capacity <25%	On—Battery capacity >25%	On—Battery capacity >50%	On—Battery capacity >75%	Flashing	Overload condition (on page 59)—UPS power capacity is exceeded while on battery with no other faults
Off	On	Off	Off	Off	Off	Flashing	Flashing	Overload condition (on page 59)—UPS power capacity is exceeded while on battery with overtemperature fault
Off	Flashing	Off	Flashing	Flashing	Flashing	Flashing	Flashing	Unit is powering down
Flashing	Flashing	Flashing	Flashing	Flashing	Flashing	Flashing	Flashing	Checksum failure error (on page 60)

\* This LED can be in any state.

For the location of individual LEDs, see "UPS front panel LED indicators (on page 8)."

## UPS is in Auto-Bypass mode

The UPS transfers from Operate mode (on page 40) to Auto-Bypass when one of the following fault conditions is detected:

- Inverter AC over voltage
- Inverter AC under voltage
- Rectifier input over current
- Inverter output over current
- Inverter fault
- Heat sink over temperature
- Fan failure
- Overload

The load is supported, but not protected while in Auto-Bypass mode.



**Action:**

1. If power management software is being used, check the log files to obtain specific error information to help identify the problem.  
For more information about the causes of a general fault condition, see the HP Power Manager user guide available for download from the HP website (<http://www.hp.com/go/rackandpower>).
2. Verify that no blockage of airflow to the front bezel and rear panel exists.

## UPS is in Converter Off mode

Fault conditions cause the UPS to transfer to Converter Off mode from Standby mode (on page 40) only. If the UPS is powering the load, fault conditions cause the UPS to transfer to Auto-Bypass mode instead.

If a fault condition exist and the UPS is running in Auto-Bypass mode (on page 41), press the Off button to transfer the UPS to Converter Off mode.

The load is not supported while in Converter Off mode.

The following fault conditions trigger Converter Off mode:

- Inverter AC over voltage
- Inverter AC under voltage
- Rectifier input over current
- Inverter output over current
- Inverter fault
- Heat sink over temperature

**Action:**

1. If power management software is being used, check the log files to obtain specific error information to help identify the problem.  
For more information about the causes of a general fault condition, see the HP Power Manager user guide available for download from the HP website (<http://www.hp.com/go/rackandpower>).
2. Verify that no blockage of airflow to the front bezel and rear panel exists.

## General alarm condition

**Action:**

1. If power management software is being used, check the log files to obtain specific error information to help identify the problem.  
For more information about the causes of a general alarm condition, see the HP Power Manager user guide available for download from the HP website (<http://www.hp.com/go/rackandpower>).
2. Check the batteries:
  - a. Allow the UPS batteries to charge for 24 hours.
  - b. If the Battery Fault LED is red, replace the batteries ("[UPS battery replacement procedure](#)" on page 47).
3. Reduce the load:
  - a. Power down the UPS ("[Powering down the UPS](#)" on page 44).

- b. Remove one or more load devices to reduce the power requirements.
      - c. Wait at least 5 seconds and restart the UPS.
      - d. If the condition persists, verify that the load devices are not defective.
  4. Allow the UPS to cool:
    - a. Power down the UPS ("[Powering down the UPS](#)" on page 44).
    - b. Clear vents and remove any heat sources.
    - c. Verify that the airflow around the UPS is not restricted.
  5. Wait at least 5 minutes and restart the UPS.
  6. If the condition persists, contact an HP authorized service representative.

## Bypass is out of range

The input voltage is not within  $\pm 12$  percent of nominal voltage.

The UPS is receiving utility power that might be unstable or in brownout conditions. The UPS continues to supply power to the connected equipment. If conditions worsen, the UPS might switch to battery power.

Bypass out of range is only a status and does not keep the UPS from transferring to Auto-Bypass mode (on page 41).

**Action:**

1. Check the input voltage and reconfigure the UPS ("[Configuring the UPS](#)" on page 42).
2. Contact a qualified electrician to verify that the utility power is suitable for the UPS.

## Battery condition

**Action:**

1. Install the battery module. If the battery module is already installed, remove and reinsert the module.
2. Allow the UPS batteries to charge for 24 hours.
3. If the LED does not turn off, replace the batteries ("[UPS battery replacement procedure](#)" on page 47).
4. If the condition persists, contact an HP authorized service representative.

## UPS is on battery

**Action:**

1. Save files and shut down connected equipment.
2. Allow the UPS batteries to charge for 24 hours.

## Input voltage is out of range

**Action:**

1. Check the input voltage and reconfigure the UPS ("[Configuring the UPS](#)" on page 42).
2. Contact a qualified electrician to verify that the utility power is suitable for the UPS.

# Overtemperature condition

**Possible cause:** The UPS internal temperature is too high, or a fan has failed.

**Action:**

1. Power down the UPS ("Powering down the UPS" on page 44).
2. Allow the UPS to cool:
  - a. Clear vents and remove any heat sources.
  - b. Be sure that the that the airflow around the UPS is not restricted.
3. Wait at least 5 minutes, and then restart the UPS.
4. If the condition persists, contact an HP authorized service representative.

# Internal UPS fault condition

**Action:**

1. Power down the UPS ("Powering down the UPS" on page 44).
2. If the condition persists, contact an HP authorized service representative.

# REPO condition

**Action:**

- If the remote switch is closed, then open the switch to enable power to the output receptacles.
- If the condition occurred while reconnecting a disconnected REPO port, then verify the polarity of the REPO connector pins.

For more information about REPO ports, see "Connecting the REPO port (on page 21)."

# Site wiring condition

**Action:** Contact a qualified electrician to be sure that:

- The line and neutral wires are not reversed in the wall outlet.
- A ground wire connection does not exist.

# Overload condition

All the load LEDs are illuminated.

**Action:**

1. Power down the UPS ("Powering down the UPS" on page 44).
2. Remove one or more load devices to reduce the power requirements.
3. Wait at least 5 seconds and restart the UPS.
4. If the condition persists, verify that the load devices are not defective.

## Checksum failure error

A Checksum failure error occurs when executing a bad load sequence, or having an incorrect EEPROM map while loading software through the serial or USB port.

**Action:**

1. Rerun the firmware upgrade.
2. If the condition persists, contact an HP authorized service representative.

## UPS does not start

**Action:**

1. Be sure that the power cord is plugged in to a utility power receptacle.
2. Check the power source at the utility power receptacle.

## Low battery shutdowns

Ungraceful shutdown of attached servers occurs when the UPS is in a low battery condition.

**Action:**

1. Verify that the power management software is not delaying the shutdown of attached servers when the UPS is in a low battery condition.
2. Allow the UPS batteries to charge for 24 hours.
3. If the Battery Fault LED is red, replace the batteries ("[UPS battery replacement procedure](#)" on page 47).

## UPS does not provide the expected backup time

**Action:**

1. If the Overload LED ("[UPS front panel controls](#)" on page 8) is illuminated, remove one or more load devices to reduce the power requirements.
2. Power down the UPS ("[Powering down the UPS](#)" on page 44).
3. Allow the UPS batteries to charge for 24 hours.
4. Initiate a self-test ("[Initiating a self-test](#)" on page 43).
5. During extended power outages, save your work, power down the load devices, and then power down the UPS ("[Powering down the UPS](#)" on page 44) to conserve battery power.

## UPS frequently switches between utility and battery power

**Action:**

1. Check the input voltage and reconfigure the UPS ("[Configuring the UPS](#)" on page 42).
2. Contact a qualified electrician to verify that the utility power is suitable for the UPS.

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# Specifications

## UPS physical specifications

Parameter	Value
Height	8.9 cm (3.5 in)
Depth	63.5 cm (25 in)
Width	44.5 cm (17.5 in)
Weight	37 kg (82 lb)

## ERM physical specifications

Parameter	Value
Height	8.9 cm (3.5 in)
Depth	63.5 cm (25 in)
Width	44.5 cm (17.5 in)
Weight	45 kg (100 lb)

## UPS input specifications

UPS model	Utility voltage frequency (Hz)	Available settings utility voltage (VAC)	Branch circuit rating (A)	Line cord
R/T3000 NA/JPN	50/60	100, 110, 120, 127	30	Nondetachable power cord with NEMA L5-30 plug
R/T3000h NA/JPN	50/60	200/208 <sup>1</sup> , 220, 230, 240	20	Nondetachable power cord with NEMA L6-20 plug
R/T3000 INTL	50/60	200/208, 220, 230, 240	16	Detachable power cord with country-specific plug

<sup>1</sup> The output voltage is 204 for this setting.

## UPS output specifications

UPS model	Load segment	Output receptacles
R/T3000 NA/JPN	1	2 x 5-20R T-Slot
—	—	1 x L5-30R
—	2	2 x 5-20R T-Slot
R/T3000h NA/JPN	1	3 x IEC-320-C13
—	—	1 x IEC-320-C19

UPS model	Load segment	Output receptacles
—	—	1 x I6-20R
—	2	3 x IEC-320-C13
—	—	1 x IEC-320-C19
R/T3000 INTL	1	3 x IEC-320-C13
—	—	1 x IEC-320-C19
—	2	3 x IEC-320-C13
—	—	1 x IEC-320-C19

## Power protection specifications

UPS model	VA	Nominal power rating (W)	Nominal voltage setting
R/T3000 NA/JPN	2880 / 2400	2700 / 2250	120/100
R/T3000h NA/JPN	3300	3000	204
R/T3000 INTL	3300	3000	230

## Output tolerance specifications

Source of power	Regulation
Utility power (nominal range)	-10% to +6% of nominal output voltage rating (within the guidelines of the Computer Business Equipment Manufacturers Association)
Battery power	±5% of nominal output voltage rating

## Output feature specifications

Feature	Specification
Online efficiency	94% nominal input voltage
Voltage wave shape	Sine wave; 5% THD with typical PFC load
Surge suppression	300J via MOVs
Noise filtering	EN 55022 line filter for normal and common mode use

## Battery specifications

Feature	Specification
Type	12 V, 5 AH, sealed, maintenance-free, rechargeable, valve regulated lead-acid batteries with a 3-5 year service life at 25°C (77°F).
Voltage	The battery modules have a battery string voltage of 120 V.

Feature	Specification
Charging	Complete charge takes no more than 48 hours. After approximately 3 hours, the batteries reach 80% charge at default nominal utility voltage and no load.

## High-voltage UPS battery runtimes

Load, percent	Estimated battery runtime	Runtime with one ERM	Runtime with two ERMs
20	40 minutes	125 minutes	225 minutes
50	12 minutes	50 minutes	89 minutes
80	6 minutes	30 minutes	54 minutes
100	4 minutes	24 minutes	43 minutes

## Low-voltage UPS battery runtimes

Load, percent	Estimated battery runtime	Runtime with one ERM	Runtime with two ERMs
20	45 minutes	142 minutes	256 minutes
50	15.5 minutes	55 minutes	99 minutes
80	7 minutes	34 minutes	60 minutes
100	5 minutes	26 minutes	47 minutes

## Environmental specifications

Feature	Specification
Operating temperature	10°C to 40°C (50°F to 104°F); UL-tested at 25°C (77°F)
Nonoperating temperature	-15°C to 40°C (-5°F to 104°F)
Relative humidity	20% to 80%; noncondensing
Operating altitude	Up to 3,000 m (9,842 ft) above sea level
Nonoperating altitude	15,000 m (49,212 ft) above sea level
Audible noise	Less than 45 dBA, normal operation Less than 50 dBA, on battery power

## REPO port specifications

The REPO port meets the requirements of NFPA 70 and NEC Articles 645-10 and 645-11 for a Disconnecting Means.

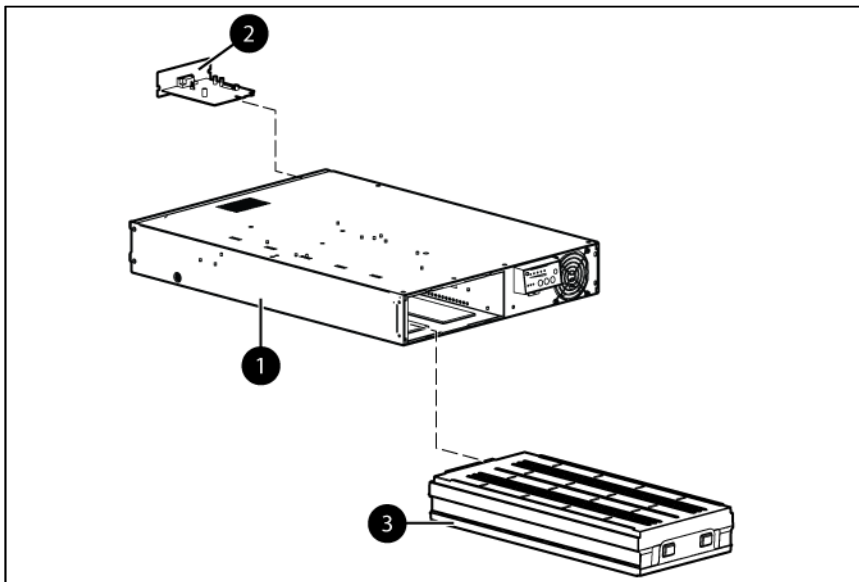
# Spares

## Ordering spares

To order a spare, visit the HP website (<http://www.hp.com/buy/parts>).

To replace parts under warranty, contact an HP authorized service representative.

## UPS spare parts list

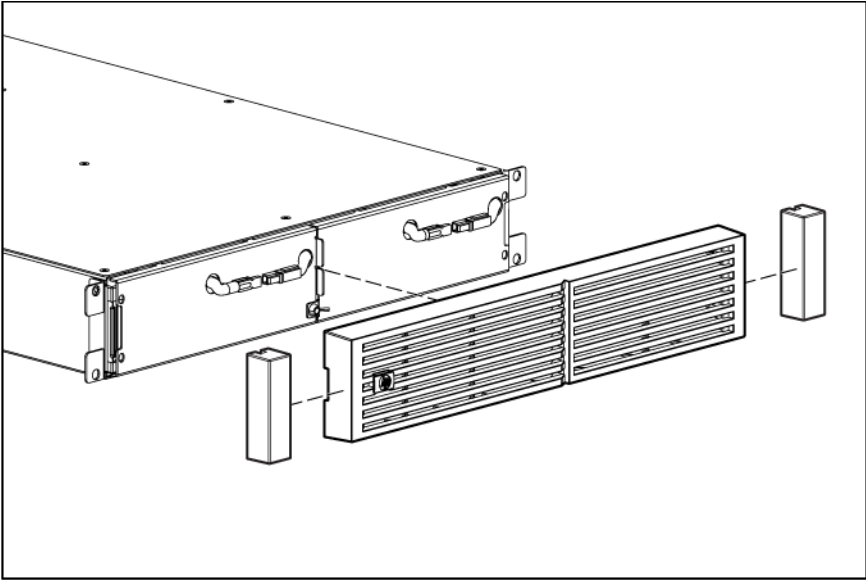


Item	Description	Spare part number
1	UPS unit	—
	a) NA/JPN	638840-001
	b) HV NA/JPN*	638841-001
	c) INTL*	638842-001
2	UPS Network Module	636934-001
3	Battery module	517703-001
4	Mounting rails with screws*	419181-001
5	UPS/ERM mounting brackets*	582931-001
6	Cord retention clips (6)*	407409-001
7	Serial download cable*	397642-001

\* not shown



# ERM spare parts list



Item	Description	Spare part number
1	ERM unit	517702-001
2	UPS/ERM mounting brackets*	582931-001
3	Mounting rails with screws*	419181-001

\* not shown

## Hardware options

For information on the supported hardware options, see the HP website (<http://www.hp.com/go/rackandpower>).

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# Support and other resources

## Before you contact HP

Be sure to have the following information available before you call HP:

- Active Health System log  
Download and have available an Active Health System log for 3 days before the failure was detected. For more information, see the *HP iLO 4 User Guide* or *HP Intelligent Provisioning User Guide* on the HP website (<http://www.hp.com/go/ilo/docs>).
- Onboard Administrator SHOW ALL report (for HP BladeSystem products only)  
For more information on obtaining the Onboard Administrator SHOW ALL report, see the HP website (<http://h20000.www2.hp.com/bizsupport/TechSupport/Document.jsp?lang=en&cc=us&objectID=c02843807>).
- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Product identification number
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

## HP contact information

For United States and worldwide contact information, see the Contact HP website (<http://www.hp.com/go/assistance>).

In the United States:

- To contact HP by phone, call 1-800-334-5144. For continuous quality improvement, calls may be recorded or monitored.
- If you have purchased a Care Pack (service upgrade), see the Support & Drivers website (<http://www8.hp.com/us/en/support-drivers.html>). If the problem cannot be resolved at the website, call 1-800-633-3600. For more information about Care Packs, see the HP website (<http://pro-aq-sama.houston.hp.com/services/cache/10950-0-0-225-121.html>).

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# Warranty information

## Limited warranty

To back up the wide range of features offered with the UPS, a 3-year limited warranty is provided.

## \$250,000 Computer Load Protection Guarantee

In addition to the limited warranty, a \$250,000 Computer Load Protection Guarantee (provided by the original equipment manufacturer) is offered.



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**IMPORTANT:** The \$250,000 Computer Load Protection Guarantee is offered only in The United States and Canada.

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The \$250,000 Computer Load Protection Guarantee only applies if:

- The UPS is plugged into a suitably grounded and wired outlet using no extension cords, adapters, other ground wires, or other electrical connections.
- The UPS installation complies with all applicable electrical and safety codes specified by the NEC.
- The UPS is used under normal operating conditions and users comply with all instructions and labels.
- The UPS is not damaged by accident (other than a utility power transient), misuse, or abuse.
  - The Guarantee applies only to the original end-user and is non-transferable.
  - The Guarantee does not include reimbursement for or restoration of any data loss.
- The UPS is either connected directly to an enterprise class PDU, which is then connected directly to a server, workstation, or personal computer, or the UPS is connected directly to a server, workstation, or personal computer.

## Pre-Failure Battery Warranty

The Pre-Failure Battery Warranty, standard on all UPS units, extends the advantage of a 3-year limited warranty by applying it to the battery before it actually fails. The Pre-Failure Battery Warranty ensures that the battery is replaced free of charge when a notification that the battery might fail is received from power protector software. The battery warranty coverage is 3 years for parts. The warranty for the first year of ownership includes parts and labor. If battery spares are not available for a particular UPS model, the entire UPS, including its battery, is replaced.

A Pre-Failure Battery warning is given 30 days before a battery failure. The warning is indicated in one or both of the following ways:

- An LED showing the battery is low
- Notification from power protector software

## Recommended duration of use

Although tests and a multitude of customer experiences have shown no noticeable performance issues with UPSs for significant time periods after expiration of the 3-year limited warranty, we strongly recommend considering replacing UPSs after a maximum of 5 to 6 years of use to assure full functionality and a safe operating environment. This recommendation does not extend or in any way alter the warranty for UPSs which is limited to a time period of 3 years and a coverage as stated in the applicable warranty statement.

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# Regulatory compliance notices

## Regulatory compliance identification numbers

For the purpose of regulatory compliance certifications and identification, this product has been assigned a unique regulatory model number. The regulatory model number can be found on the product nameplate label, along with all required approval markings and information. When requesting compliance information for this product, always refer to this regulatory model number. The regulatory model number is not the marketing name or model number of the product.

## Federal Communications Commission notice

Part 15 of the Federal Communications Commission (FCC) Rules and Regulations has established Radio Frequency (RF) emission limits to provide an interference-free radio frequency spectrum. Many electronic devices, including computers, generate RF energy incidental to their intended function and are, therefore, covered by these rules. These rules place computers and related peripheral devices into two classes, A and B, depending upon their intended installation. Class A devices are those that may reasonably be expected to be installed in a business or commercial environment. Class B devices are those that may reasonably be expected to be installed in a residential environment (for example, personal computers). The FCC requires devices in both classes to bear a label indicating the interference potential of the device as well as additional operating instructions for the user.

## FCC rating label

The FCC rating label on the device shows the classification (A or B) of the equipment. Class B devices have an FCC logo or ID on the label. Class A devices do not have an FCC logo or ID on the label. After you determine the class of the device, refer to the corresponding statement.

## FCC Notice, Class A Equipment

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at personal expense.

## FCC Notice, Class B Equipment

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to

radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit that is different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or television technician for help.

## Declaration of conformity for products marked with the FCC logo, United States only

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions regarding this product, contact us by mail or telephone:

- Hewlett-Packard Company  
P. O. Box 692000, Mail Stop 530113  
Houston, Texas 77269-2000
- 1-800-HP-INVENT (1-800-474-6836). (For continuous quality improvement, calls may be recorded or monitored.)

For questions regarding this FCC declaration, contact us by mail or telephone:

- Hewlett-Packard Company  
P. O. Box 692000, Mail Stop 510101  
Houston, Texas 77269-2000
- 1-281-514-3333

To identify this product, refer to the part, series, or model number found on the product.

## Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company may void the user's authority to operate the equipment.

## Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

## Canadian notice (Avis Canadien)

### **Class A equipment**

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

### **Class B equipment**

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

## European Union regulatory notice

Products bearing the CE marking comply with the following EU Directives:

- Low Voltage Directive 2006/95/EC
- EMC Directive 2004/108/EC
- Ecodesign Directive 2009/125/EC, where applicable

CE compliance of this product is valid if powered with the correct CE-marked AC adapter provided by HP.

Compliance with these directives implies conformity to applicable harmonized European standards (European Norms) that are listed in the EU Declaration of Conformity issued by HP for this product or product family and available (in English only) either within the product documentation or at the following HP website (<http://www.hp.eu/certificates>) (type the product number in the search field).

The compliance is indicated by one of the following conformity markings placed on the product:

For non-telecommunications products and for EU harmonized telecommunications products, such as Bluetooth® within power class below 10mW.



For EU non-harmonized telecommunications products (If applicable, a 4-digit notified body number is inserted between CE and !).



Please refer to the regulatory label provided on the product.

The point of contact for regulatory matters is Hewlett-Packard GmbH, Dept./MS: HQ-TRE, Herrenberger Strasse 140, 71034 Boeblingen, GERMANY.

## Disposal of waste equipment by users in private households in the European Union



This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

## Japanese notice

ご使用になっている装置に VCCI マークが付いていましたら、次の説明文をお読み下さい。

この装置は、クラス B 情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。取扱説明書に従って正しい取り扱いをして下さい。

VCCI-B

VCCI マークが付いていない場合には、次の点にご注意下さい。

この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者は適切な対策を講ずるよう要求されることがあります。

VCCI-A

## BSMI notice

警告使用者:

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

## Korean notice

### Class A equipment

A급 기기 (업무용 방송통신기기)	이 기기는 업무용(A급)으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정 외의 지역에서 사용하는 것을 목적으로 합니다.
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## Class B equipment

B급 기기 (가정용 방송통신기기)	이 기기는 가정용(B급)으로 전자파적합등록을 한 기기로서 주로 가정에서 사용하는 것을 목적으로 하며, 모든 지역에서 사용할 수 있습니다.
-----------------------	--

## Chinese notice

### Class A equipment

声明

此为 A 级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对干扰采取可行的措施。

## Battery replacement notice



**WARNING:** Power products contain sealed lead-acid battery modules. A risk of fire and burns exists if the battery is not properly handled. To reduce the risk of personal injury:

- Do not attempt to recharge the battery.
- Do not expose the battery to temperatures higher than 60°C (140°F).
- Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water. The battery might explode.



Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. To forward them to recycling or proper disposal, use the public collection system or return them to HP, an authorized HP Partner, or their agents.

For more information about battery replacement or proper disposal, contact an authorized reseller or an authorized service provider.

## Taiwan battery recycling notice

The Taiwan EPA requires dry battery manufacturing or importing firms in accordance with Article 15 of the Waste Disposal Act to indicate the recovery marks on the batteries used in sales, giveaway or promotion. Contact a qualified Taiwanese recycler for proper battery disposal.



## Power cord statement for Japan

製品には、同梱された電源コードをお使い下さい。  
同梱された電源コードは、他の製品では使用出来ません。

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# Electrostatic discharge

## Preventing electrostatic discharge

To prevent damaging the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

## Grounding methods to prevent electrostatic discharge

Several methods are used for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm  $\pm 10$  percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an authorized reseller install the part.

For more information on static electricity or assistance with product installation, contact an authorized reseller.

---

# Acronyms and abbreviations

## EEPROM

electrical erasable programmable read only memory

## ERM

extended runtime module

## IEC

International Electrotechnical Commission

## MOV

metal oxide varistor

## PDU

power distribution unit

## PFC

power factor corrected

## REPO

remote emergency power off

## THD

total harmonic distortion

## UPS

uninterruptible power system

## USB

universal serial bus

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# Documentation feedback

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